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Language arts teachers endeavor to lay a general foundation in reading as a part of the communication program. Each subject area, however, has particular reading problems which must be faced by the teacher in developing an instructional program. Suggestions are offered to junior high school teachers for improving instruction by giving specific attention to reading problems peculiar to each of the subject fields. Attention is given to reading skills, lessons, and additional narrative information in social studies, science, mathematics, industrial arts, and language arts. These are devised to assist the subject specialist in giving instruction in those reading skills basic to mastery of the content of the subject. The lessons in each subject area are intended for students reading at or about grade level. Each skill lesson in the body of the manual begins with a "problem" approach. For example, if a teacher recognizes that students cannot extract meaning from given printed materials because the vocabulary is too difficult, then instruction is given in the use of contextual clues to determine word meaning. As indicated in each lesson, the stated "problem" is the only approach of motivation to the lesson. After the problem is identified, direct instruction in the skill is given. Each lesson plan is divided into two columns. Column I describes the procedures necessary for giving instruction in a specific reading skill. Column II gives detailed examples that illustrate the development of the procedures. The language arts reading lessons in the appendix are intended for instructing the functional non-reader.

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READING in the SUBJECT AREAS

Grades 7·8·9

Board of Education of the City of New York

Curriculum Bulletin **1963-64 Series • No. 6**

READING
in the
SUBJECT AREAS

Grades 7•8•9

Board of Education of the City of New York

Educational Materials Laboratory
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MAY 1965
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FOREWORD

The material in this bulletin grew out of an extended study in Junior High Schools devoted to reading in the subject areas. The purpose of the bulletin is to offer suggestions to teachers for improving instruction by giving specific attention to reading problems peculiar to each of the subject fields.

Language Arts teachers endeavor to lay a general foundation in reading as a part of the communication program. Each subject area, however, has particular reading problems which must be faced by the teacher in developing an instructional program. It is only when such an approach is followed that students will learn to read independently with maximum comprehension. The importance of reading skills as an integral part of the subject lesson is generally recognized. It follows therefore, that subject teachers are an important part of the team concerned with improving reading and optimum understanding in each subject field.

JOSEPH O. LORETAN
Deputy Superintendent

June, 1964

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The manual was extended and completed under the direction of Acting Associate Superintendent Martha R. Finkler and Assistant Superintendent Max G. Rubinstein. Mr. Rubinstein, in charge of Language Arts in the Junior High School Division, reviewed the final manuscript.

This manual was developed and written by Marguerite Ferrerio and Lily Kaufman, reading consultants in the Junior High School Division, under the guidance of Margaret Lalor, Reading Coordinator of the Junior High Schools. Members of the Junior High School Reading Project contributed materials.

Assistant Director of Industrial Arts Emanuel Gillers served as advisor, as did the following coordinators of the Junior High School Division: Anita Dore, Language Arts; Gene Satin, Social Studies; Alice Pataky, Science; Frank Wohlfort, Mathematics.

Many subject area teachers in the junior high schools throughout the city conducted trial runs of the lessons and offered helpful suggestions which are incorporated in this publication.

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INTRODUCTION

BASIC CONSIDERATIONS

As early as 1925, the need for a direct approach in the teaching of reading skills in the subject areas was accorded nationwide focus in a report issued by the National Committee on Reading. This report set forth the variety of skills which should be taught and the need for reading guidance in all areas for the purpose of developing a well-rounded competent reader. Subsequent classroom experiments and data gathered therefrom sustained this premise, for again in 1937, the Second National Committee on Reading stated:

> The teacher of every curriculum field is recognized as a teacher of reading in the sense that he stimulates and directs the experiences of pupils and promotes increased efficiency in the various activities required. In the judgment of the Committee, the greatest opportunity for progress in teaching reading during the next decade lies in an intelligent attack on reading problems that arise in the content fields. [1]

During the following ten-year period, as textbook-centered teaching decreased and additional printed aids to learning increased, teachers and administrators throughout the country continued to express concern about the reading competency of students. This concern led to the selection of the theme for the Annual Conference on Reading, Improving Reading in Content Fields, held at the University of Chicago in 1946. At this meeting, Dr. William S. Gray summed up the tenor of the meeting as follows:

> The basic view... is that teachers of different curriculum fields become concerned about reading problems as reading assumes importance in attaining the aims of teaching in those fields. The three major duties of such teachers with respect to reading are to provide optimum conditions under which acquired reading abilities may be used in attaining worthwhile goals, to promote growth in many aspects of reading which are unique to given fields, and to provide specific training in reading when, for any reason, they are assigned reading materials that are above the reading level of the pupils in their classes. The final level of reading competence attained by pupils in elementary and secondary schools is the product of the effort of all teachers...[2]

This position on the need for reading instruction in all subject areas was reiterated at the 1952 conference, and part of the proceedings were devoted to the administrative and supervisory aspects of the problem. Since then, the professional writings of subject area specialists, who have concerned themselves with methodology and content, attest to the need for teachers to develop those reading skills that pertain to a given subject.

The impetus of the ever-growing concern for the reading competency of students stems from an enlightened public demand for high scholastic standards, competitive demands for college entrance, employer demands for lietrate personnel, and the personal demands for knowledge as a result of living in a highly technical and scientific age.

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[1] *The Teaching of Reading: A Second Report,* Thirty-sixth Yearbook of the National Society for the Study of Education, Part I. Chicago: Distributed by the University of Chicago Press, 1937, pp. 19-20.

[2] *Improving Reading in Content Fields.* Proceedings of the Annual Conference on Reading. Compiled and edited by William S. Gray, University of Chicago Press, January 1947, p. 4.

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USING THE MANUAL

This manual includes reading skills lessons and additional narrative information in social studies, science, mathematics, industrial arts, and language arts devised to assist the subject specialist in giving instruction in those reading skills basic to mastery of the content of the subject.

Guide to Reading Skills in the Subject Areas

The listing that follows indicates the major reading skills involved in the selected subject areas. When a specific lesson on a skill is included in this publication, the page number is indicated in the subject area. When a lesson is not included in the manual, an (X) is indicated. However, the subject area teacher is responsible for developing the skill involved. When the skill is treated within another lesson, an asterisk (*) guides the teacher to the page and subject area where the development of the skill is located.

Reading Skills			**Subject Areas**		
WORD RECOGNITION	L.A.	S.S.	SCI.	MATH.	IND. ARTS
1. recognize basic sight words	x				
2. use phonetic analysis	90, 94				
3. use structural analysis	98, 101				
4. use contextual clues for word meaning	x	6, 7, 9	39	52, 53	62, 63
5. use dictionary to check meaning	x	*7	x	x	x
COMPREHENSION					
1. understand word and sentence meaning	x	x	x	x	x
2. find main idea and related details	x	11, 12, 14	x	x	x
3. organize and classify facts	x	24	47	x	x
4. perceive sequence of ideas	x	*12, *14	*44	*57	*70
5. draw inferences and conclusions	x	*14	*44	*57	
6. understand problems	x	*18	*44	57	x
7. form judgments	x	*14	*44	*57	
8. predict outcomes	x		*44	*57	
9. read critically - distinguishing fact from opinion	x	21	x		
10. read for appreciation	x				
11. understand relationships	x	*11,*12,*14	*44	*57	*70
12. follow directions	x	x	44	x	70
WORK STUDY					
1. understand parts of a book	80	x	x	x	
2. understand the index of a text	84	*34	x	x	
3. use of the dictionary	74, 77, 105	*7	x	x	
4. use of the encyclopedia	x	34	x		
5. understand library techniques	x	x	x		
6. interpret maps	x	27	x	x	
7. understand charts	x	x	*47	x	x
8. interpret graphs	x	31	x	x	
9. understand diagrams	x	x	41	*57	66
10. adjust reading rate-skim	x	17, 18	x	x	x
11. select and evaluate information	x	*18	x	x	x
12. use techniques of retention and recall	x	*24	*47	x	x

Allocation of Time

The Junior High School Division is aware of the extensive content for which subject area teachers are responsible. For this reason, the lessons in the manual are designed to take only part of a period. Teachers can then use the remainder of the period for giving instruction in the content of their fields. Teachers may also terminate a lesson at a given point, and in a subsequent lesson, review the previous learnings and complete the lesson.

Flexibility of Lessons

The lessons in each subject area are intended for students reading at or about grade level. However, the lessons are flexible in that the same procedures may be used by teachers of all subject areas to instruct students reading above or below grade level, merely by substituting more complex or simpler subject area examples which meet the needs of the students.

Problem Approach to Lessons

Each skill lesson in the body of the manual begins with a "problem" approach. For example, if a teacher recognizes that students cannot extract meaning from given printed materials because the vocabulary is too difficult, then the teacher gives instruction in the use of contextual clues to dedermine word meaning, et al. As indicated in each lesson, the stated "problem" is the only approach or motivation to the lesson.

Direct Teaching

After the "problem" is identified, direct instruction in the skill is given. The five basic elements of sound teaching practices are included in the procedures of the direct teaching steps, without specific reference to the terminology Aim, Motivation, Procedure, Summary, and Application.

Organization of Lessons in Body of the Manual

Each lesson plan is divided into two columns. Column I describes the procedures necessary for giving instruction in a specific reading skill. Column II gives detailed examples that show the development of the procedures. The examples in Column II have that one purpose only—to demonstrate how the procedures are developed. Fairly simple examples are purposely used to demonstrate this development, to make it easier for the beginning teacher to follow the plans.

Organization of Lessons in the Appendix

The language arts reading lessons in the appendix are intended for instructing the functional nonreader. They too are divided into two columns. However, since reading is an integral part of the language arts program, they are full period lessons, composed of the following parts, each with its own specific purpose and use:

Approach

To arouse student interest.
To develop recognition of the purpose of the lesson.

Direct Teaching

To develop the lesson, step by step, each step in its proper sequential order.
To include the technique of good questioning throughout the lesson.
To involve students in active participation throughout the lesson.
To check on students' understanding of the learnings of the lesson.

Summary

To review the purpose and use of the lesson.
To highlight the specific learnings of the lesson.

Introductory and Final Notes to Lessons

Important information which relates to the skills lessons is included in all areas, both preceding and following the development of the skills. The introductory notes suggest pre-activities that must be reviewed or taught before the lesson is given. For example, before receiving instruction is reading and interpreting a graph in social studies, it is essential that students understand such terminology as horizontal, verictal, etc. These introductory notes also explain the sequential order of the reading skills and offer suggestions for more advanced follow-up skills.

Bibliography

A bibliography of instructional materials pertinent to each subject area follows the Appendix. These materials suggest professional readings, free and inexpensive materials, and practice materials, found useful for the teacher specialist.

CHAPTER I

TEACHING READING IN SOCIAL STUDIES

In the area of social studies, students are dependent upon reading for the major part of the information that must be acquired. Students need instruction in the effective use of a wide variety of reading skills in order to understand the diverse content and graphic materials basic to social studies mastery. Some of these skills, initially taught by the language arts teacher, must now be applied and developed in functional social studies situations. Other skills, unique to social studies, must be learned in definitely planned procedures within the framework of the social studies program and then reinforced and refined as the students proceed from grade to grade. Thus, reading forms an essential part of the social studies course of study.[1]

The conscientious teacher naturally inquires, "What reading skills do I teach?" and "How much time do I devote to the teaching of reading?" No arbitrary answers can be given these questions because the answers must be formulated by the individual teacher on the basis of the ability level and needs of a specific group of students.

The social studies curriculum makes provision for the teaching of skills which arise naturally during the study of a unit, and also, for the teaching of skills which arise outside the framework of the unit. The teacher is reminded, however, that there is a relationship and overlapping of specific skills. For example, developing ability in noting details and in noting the sequence of ideas and facts, are integral parts of developing the ability to select the main idea, and, as such, are included in lessons on understanding paragraphs. The work-study skill, using textbook aids, is developed in part in a lesson on organizing a long unit of content, through the use of some of an author's organizational devices. (printing clues)

---

1. See *Social Studies: Grades 7-8-9* (Curriculum Bulletin No. 5, 1951-52 Series) for the following: Skills and Abilities, pp. 10-11; Research, pp. 43-46; Word Concepts, p. 57; Supervised Study, pp. 62-63; and, Skills used in Social Studies, pp. 70-71.

UNDERSTANDING VOCABULARY

Words that are specific to social studies must be taught. Mere verbal pronunciation and definition are not enough. Direct instruction is desirable so that meanings are developed fully and clearly through the use of a variety of materials. Very often, words are explained in the text itself but students must be made aware of, and directed to use, this valuable aid to meaning. (See Lesson I for definition or synonym appearing in context.) If the textbook content offers no clues to the meanings of new words, then direct teaching must be given, as illustrated in Lessons II and III.

There are other types of contextual clues to word meaning which students should be taught to recognize as they read, such as:

1. When a statement of an opposite nature appears in the context.
   Example: Life in country places differs greatly from life in urban areas. (city)
2. When the context permits anticipation of a term.
   Example: The flashlight revealed a vein of gold in the mine. (showed)

For additional contextual clues to word meaning, see manual, Reading - Grades 7-8-9, p. 24.

LESSON I

Problem: Students fail to recognize that there are clues to the meaning of new words contained in the text.

Required Skill: Finding the meaning of new words when they are clearly explained in the text.

	PROCEDURE		DEVELOPMENT
1.	List on board or chart the new words found in a specific section of the text.	1. Say:	In the section of a text devoted to the Growth of Industries in Southwestern United States, the following new words appear: bauxite, helium, mohair, petroleum. (Write words on board.)
2.	State that texts often include clues which point to new words and their meanings.	2. Say:	The author of this book has used several devices to help you determine the meaning of words.
3.	Have students locate one new word on a specific page of the text. Through questioning, determine from students how they were able to locate the word so quickly.	3. Q: A:	Locate the first word on page.... What enabled you to locate the word, bauxite, so quickly? It was printed in italics, or, enclosed in parentheses.[2] (Clue I)
4.	Have pupils read the sentence which contains the new word silently. Through questioning, lead them to discover that the word is clearly	4. Say:	Read silently the sentence that contains the word bauxite. (Bauxite is an ore from which aluminum is made.)

---

[2] In some texts the new words are neither italicized nor enclosed in parentheses, and yet the text contains contextual clues to the meanings of these words. If this is the case, write the sentences containing the new words on the board and, begin with Step 4 in the procedures to develop the vocabulary skill.

PROCEDURE	DEVELOPMENT
4. (Continued) defined in the context. Write the definition of the new word on board or chart.	4. Q: What does the word bauxite mean? (An ore from which aluminum is made.) How did the author help you to understand the meaning of the word? A: The author included a definition of the word right in the sentence itself. (Clue II)
5. Follow the procedures described in steps 3 and 4 above to find contextual clues to the meanings of the remaining words listed on board or chart.	5. Helium is a very light gas used in balloons and airships because it will not burn. (Definition) Cloth made from the long silky hair of the Angora goat is called mohair. (Definition) Petroleum, or crude oil, is often called "black gold." (Synonym set off by commas and the word, or.)
6. Review the new words and their meanings as developed in this lesson.	6. bauxite - an ore from which aluminum - is made helium - a very light gas which will not burn or explode mohair - cloth made from the hair of the Angora goat petroleum - crude oil
7. Have pupils recall the two types of clues provided by the author: Clue I - to aid in locating new words quickly. Clue II - to aid in understanding the meanings of new words.	7. Clue I - New words printed in italics or enclosed in parentheses. Clue II - Definitions or synonyms included in the context.

LESSON II

Problem: Students encounter new words in a text that does not contain clues to their meanings.

Required Skill: Finding the exact meanings of words when no clues to their meanings appear in the text.

PROCEDURE	DEVELOPMENT
1. Present a sentence in which the new word appears, and through questioning, lead pupils to understand the following points:	1. When digging an oil well, a derrick is most important.
a. The sentence does not include contextual clues to the meaning of the new word.	a. Q: Does this sentence help you to understand the meaning of the word derrick? Why not? A: The sentence does not contain clues to its exact meaning.

	PROCEDURE		DEVELOPMENT
1.	b. The dictionary is the best source for finding the meaning of the new word as it is used in the sentence.	1.	b. Q: How can we find the meaning of derrick as it is used in this sentence? A: The dictionary is the best source for finding the exact meaning of the word as it is used in this sentence.
	c. "Key" words in the sentence help in selecting the exact meaning of the word when several meanings are listed in the dictionary.		c. Q: Are there any words in the sentence that might offer us a clue to choosing its exact meaning if several meanings are listed in the dictionary? A: The words, digging an oil well, offer a clue to its exact meaning in this sentence.
2.	Write the dictionary meanings of the new word on the blackboard or chart and have pupils select the one appropriate to the sentence and give a reason for their choice. Underline the meaning on the board.	2.	Definitions: The word derrick means: 1. --a machine for moving heavy weights by means of a long beam fitted with pulleys and ropes. 2. --a towerlike framework over an oil well, gas well, etc., that holds the the drilling and hoisting machinery used in digging wells. The second meaning above is the appropriate one because the sentence definitely refers to the digging of an oil well.
3.	Reinforce the meaning of the new word by having pupils use it in sentences that explain its meaning.	3.	1. A derrick is a huge framework built over an oil well to support the machinery used in digging wells. (Definition) 2. The tower built over an oil well to support the machinery used in digging wells is called a derrick. (Definition)
4.	Following the procedures in 1, 2, and 3 above, have pupils find the exact meanings of other words when no clues appear in the text.	4.	1. The refining of oil is a most important industry in southwestern United States. 2. A salt mine is like a quarry under the ground.
5.	Review the meanings of the words as they are used in today's lesson and list them on the blackboard.	5.	1. Derrick--a towerlike framework built over an oil well, gas well, etc., that holds the drilling and hoisting machinery used in digging wells. 2. Refining--freeing from impurities. 3. Quarry--place under the ground where salt is dug, cut, or blasted out.
6.	Summarize the lesson by highlighting the source for finding the exact meanings of words according to the context in which they are used.	6.	The dictionary is the best source for finding the exact meanings of words when no specific clues to their meanings appear in the context.

Lesson III

Problem: There is a need to clarify the meanings of many familiar words when used in social studies context.

Required Skill: Understanding that familiar words often have different meanings according to the context in which they are used.

PROCEDURE	DEVELOPMENT
1. Write a familiar word on the board and review its familiar meaning. Lead pupils to recognize how inappropriate this meaning is in an expression taken from a social studies text.	1. Familiar word: age Say: If I say that the new boy is about the same age as John, you would know that I was referring to John's age, expressed in years. In social studies, when you meet the expression, "age of steel," do you think it means steel's age expressed in years? Why not? The familiar word must have a different meaning in the expression, "age of steel," because it does not refer to steel's age expressed in years.
2. State that familiar words often have different meanings according to the context in which they are used.	2. Say: There are many familiar words which have different meanings when found in a social studies text.
3a. Write the expression encountered in the text on the board.	3a. The expression, "age of steel," taken from the section of a text devoted to the Industrial Era.
b. Develop its meaning orally by discussing with students the meaning of similar familiar expressions.	b. Discuss the meaning of the space age, the age of missiles, and the rocket age. Elicit from students the fact that these expressions refer to the present period of time in which rockets, missiles, and space travel are important to our way of life. Say: Just as the above expressions refer to the present period of time when rockets, missiles, and space are important to our way of life, so the expression, "age of steel," refers to that period of time when the use of steel vitally affected the lives of people.
c. Write the meaning developed on the blackboard.	c. Age of steel--period of time when the use of steel vitally affected the lives of people. (Write on board.)
4. Follow steps 1, 2, and 3 to develop the different meanings of other familiar words.	4. Bed of sulphur--layer of earth that contains sulphur. Preventing a strike--preventing a work stoppage.
5. Review the meanings of the words developed in this lesson to reinforce the concept that familiar words often have different meanings when used in social studies context.	5. Age of steel Bed of sulphur Preventing a strike (See meanings in 3c and 4.)

A Final Note

There is special vocabulary pertinent to every unit of work in the social studies curriculum. The procedures in Lessons I, II, and III, may be used to develop this vocabulary, if the specific problem described in each lesson arises, and the need for the skill is evident to the teacher.

When a teacher finds that students already have an understanding of the skill described in Lesson I, then the teacher briefly reinforces the understanding of the skill, and proceeds to Lessons II and III.

UNDERSTANDING PARAGRAPHS

The ability to recognize the main idea of a paragraph requires a number of important understandings. It requires the understanding that the separate thoughts or details of a paragraph relate to each other and that this relationship can be expressed as a topic or main idea sentence. It requires the understanding that the main idea sentence may be easy or difficult to find, according to the logical, or lack of logical, arrangement of the paragraph. The less obvious the arrangement, the more difficult it is to find the main idea. For example, some paragraphs directly express the main idea in the first sentence. Others express it in the last sentence or within the body of the paragraph itself. There are other paragraphs wherein the main idea is not directly expressed but must be inferred from the related details within each paragraph. Therefore it is important that pupils receive instruction in understanding paragraphs through a program of sequential development similar to that described in Lessons I, II, and III that follow. (Manual Reading - Grades 7-8-9, p. 27.)

The teachers involved in evaluating these lessons suggested that, as a time-saver, teachers rexograph the materials instead of copying them on the board.

LESSON I

Problem: In reporting on news articles, students show a need for understanding the main idea of paragraphs.

Required Skill: Finding the main idea of a paragraph when it is directly expressed in the first sentence.

PROCEDURE	DEVELOPMENT
1. Write the headline or title of a news article on the blackboard and read the first paragraph of the article to the students orally, directing them to listen carefully to note the sentence that suggests the headline. Use example to the right, or a similar one. (Step I)	1. Headline: Educational T.V. by "Phone" First Paragraph: Instruction is advancing on all fronts with the advent of educational T.V. by phone. A single teacher can personally instruct thousands of students in dozens of schools over special T.V. telephone lines. General Telephone and Electronics is bringing this modern form of education to the nation's schools through its own Operating Companies in areas of thirty-two states. This advanced educational system includes inexpensive T.V. cameras and receivers developed by a subsidiary company, Sylvania.
2. Question students about the sentence that suggests the headline and tell students what this sentence is called. (Main Idea) Write the sentence on board. (Step II)	2. Q: Which sentence suggests the headline? Why? A: The first sentence "Instruction is advancing on all fronts with the advent of educational T.V. by phone," suggests the headline because the headline is a condensed version of this sentence.

PROCEDURE	DEVELOPMENT
	2. Say: The first sentence in this paragraph is called the main idea sentence. The remaining sentences in the paragraph must relate to the main idea sentence.
3. Read the remaining sentences of the paragraph, one at a time, and prove that each sentence relates to the main idea sentence. (Step III)	3. The sentence, "A single teacher...over special T.V. telephone lines," gives information about educational T.V. by phone. The sentence, "General Telephone...in areas of thirty-two states," gives more details about educational T.V. by phone. The sentence, "This advanced educational system...by a subsidiary company, Sylvania," gives additional information about educational T.V. by phone.
4. Review the three steps listed above to find the main idea sentence of the first paragraph of a news article and write the steps on the blackboard or chart.	4. Read the headline or title of the article. (Step I) Read the first paragraph to find the sentence that suggests the headline. (Main Idea Sentence-Step II) Prove that each of the remaining sentences relates to the main idea sentence. (Step III)
5. Have pupils use the three steps above to find the main idea sentence in the first paragraph of a news article similar to that at the right. (Check results.)	5. Headline: Weatherproofed Cars The modern car is weatherproofed to stay newer longer and to protect the buyer's investment. Galvanized steel is used for the underbody parts that are most subject to rust. Stainless steel screws are used on all points exposed to the elements. A more durable four coat finish, with two outer coats of baked enamel, is put on every car.

LESSON II

Problem: The text students are using contains paragraphs in which the main idea is not expressed in the first sentence.

Required Skill: Finding the main idea of a paragraph when it is expressed in part of the paragraph other than the first sentence.

PROCEDURE	DEVELOPMENT
1. Copy on the blackboard or chart, a paragraph, the same as, or similar to, that shown in the	1. One reason the United Nations was created was to save succeeding generations from

PROCEDURE	DEVELOPMENT
1. (Continued) example on the right.	1. (Continued) the scourge of war. Another reason was to reaffirm faith in fundamental human rights. Still a third reason was to establish conditions under which justice and respect for obligations arising from treaties and other sources of international law could be maintained. Last of all, the United Nations was created to promote social progress and a better standard of life. The reasons for creating the United Nations were set down in its original charter. (From Collier's Encyclopedia, Vol. 19, 62c, 1956 Ed.)
2. Clarify the meanings of difficult words included in the above paragraph.	2. "Succeeding generations" means the generations that follow. "Scourge of war" means the punishment that war brings with it. "Reaffirm faith" means to declare faith again.
3. State that there is a simple method for finding the main idea when it is expressed in any part of the paragraph.	3. Say: We will learn an easy way to find the main idea of a paragraph when it is expressed in any part of the paragraph.
4. Direct pupils to read the paragraph silently to get a general impression of the paragraph as a whole and question them about possible titles for the paragraph.	4. Say: Read this paragraph silently. (Number 1 in Column II) Decide the title you would suggest for it. Give reason for your choice.
5a. Write the suggested titles on the blackboard.	5a. Suggested Titles: The United Nations Reasons for Creating the U.N. The Creation of the U.N.
b. Have students read the paragraph again to select the best possible title.	b. Best Possible Title: Reasons for Creating the U.N.
c. Then have students find the sentence that suggests this title. Tell students that this is the main idea sentence.	c. The sentence that suggests the best title: The reasons for creating the United Nations were set down in its original charter. (Main Idea Sentence)
6. Underline the title and the main idea sentence and have pupils note its position in the paragraph.	6. The main idea sentence is expressed in the last sentence of the paragraph. (Underline title and main idea sentence.)
7a. Prove that each detail sentence relates to the main idea sentence.	7a. Each detail sentence gives a reason for creating the U.N.
b. Draw pupils' attention to the clue words that indicate the sequential order of the details of the paragraph.	b. Clue words: One reason Another reason Still a third reason Last of all

PROCEDURE	DEVELOPMENT
8. Review the steps used to find the main idea of a paragraph, as indicated at the right, and write them on the board or chart.	8. 1. Read the paragraph to form a general impression of its contents. 2. Decide on a suitable title for the paragraph. 3. Locate the sentence that suggests the title. 4. Prove that the remaining sentences relate to the sentence that suggests the title.*
9. Have pupils follow the steps listed in 8 above to find the main idea expressed in additional paragraphs, similar to that at the right.	9. The Food and Agricultural Organization of the United Nations conducts programs to increase food production in many countries. The International Refugee Organization of the United Nations aids hundreds of thousands of displaced persons and refugees who are victims of political oppression. The International Labor Organization of the United Nations works for improvements in labor conditions throughout the world. An International Office of Education of the United Nations promotes educational and cultural cooperation among the nations of the world. There are many organizations in the United Nations concerned with bettering the living conditions of people throughout the world.

LESSON III

Problem: A section of the text includes paragraphs in which the main idea is not directly expressed.

Required Skill: Finding the main idea of a paragraph when it is not directly expressed but must be inferred from the paragraph as a whole.

PROCEDURE	DEVELOPMENT
1. Write a paragraph on the blackboard, the same as or similar to that on the right, and have students read it silently to get a general impression of the paragraph as a whole.	1. In the early twenties, the Washington Conference and the World Court helped to bring about a more friendly feeling among nations. Before that, the League of Nations, established after World War I, helped to avert some wars. In the late twenties, the Paris Peace Pact did much to gain peace in the world. In 1945, the United Nations was established to bring about world peace.

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* Draw pupils' attention to the fact that the four steps just listed may also be used to locate the main idea of a paragraph when it is expressed in any part of the paragraph. (First sentence, last sentence, or within the body of the paragraph.)

PROCEDURE	DEVELOPMENT
2. Question students about their general impression of the paragraph. Have them attempt to suggest a suitable title for it and elicit reasons for their inability to do so.	2. Q: Can you suggest a suitable title for the paragraph? Why not? A: Each sentence seems to say something about a totally different thing.
3. Underline on the board the different item that is mentioned in each sentence of the paragraph.	3. Sentence 1 says something about the Washington Conference and World Court; sentence 2---the League of Nations; sentence 3---the Paris Peace Pact; sentence 4---the United Nations.
4. Have students re-read what is said about each different item to note the related thought common to all. Write the related thought on the blackboard.	4. Washington Conference and World Court---helped to bring about a more friendly feeling among nations. League of Nations---helped to avert some wars. Paris Peace Pact---did much to gain peace in the world. United Nations---was established to bring about world peace. The related thought common to all---establishing peace in the world.
5. Have students express the related thought in a sentence and explain that though there was no main idea sentence expressed in the paragraph, the main idea could be inferred from the related details within the paragraph.	5. Suggested Main Idea Sentences: (1.) There have been many attempts to establish world peace. (2.) Many steps have been taken to establish peace in the world.
6. Review the steps needed to infer the main idea of a paragraph. Write the steps on board or chart.[3]	6. (1.) Read the paragraph and think of a suitable title for it. (Note that you are unable to suggest a title because each sentence seems to say something about a totally different thing.) (2.) Re-read the paragraph to find a common relationship existing among all the sentences. (3.) Express this common relationship in a complete thought. (Main Idea Sentence)
7. Use the steps reviewed in 6 above to infer the main idea in carefully selected paragraphs in which the main idea is not directly expressed,	7. When Japan invaded Manchuria in 1931, the League of Nations was powerless to do more than censure her for this aggression. Subse-

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[3] The teacher may prefer to keep a permanent record of the steps developed in step 6 by making a chart which can be used over and over again to reinforce the skill of inferring the main idea of a paragraph.

PROCEDURE

7. (Continued)

but must be inferred from the related details in all sentences in the paragraph. (See example to the right.)

DEVELOPMENT

7. (Continued)

quently, Germany, encouraged by the League's lack of power to act against Japan, rearmed and reoccupied the Rhineland. Then, in 1935, Italy followed suit by invading Ethiopia in defiance of the League. Finally, when the Soviet Union invaded Finland in 1939, the League was totally powerless to act because the world was at war. (Main Idea Sentence: The League of Nations was not an effective means of preventing war.)

A Final Note

There are additional, more complex main idea skills in which students need direct instruction. The procedures listed in Step 8, Lesson II, may be used to develop the following skills:

1. Where the main idea is expressed in only part of a sentence.

   Example: The atom bomb is recognized everywhere as a source of destruction, and yet atomic energy offers unbelievable peacetime possibilities. It is already being used in industry. Atomic powered ships, planes, and cars, are predicted in the near future for use in everyday life. A small amount of atomic energy is sufficient to propel a ship to Europe. Atomic energy is being used effectively at the present time for detecting certain illnesses.

2. Where the main idea of a paragraph is expressed in two sentences.

   Example: Carefully drawn plans are essential in the building industry in New York. So is the careful execution of these plans. Architects make the original plans. Building contractors and workers erect the buildings according to the exact specifications of the plans. Architects supervise the construction to make certain the plans are executed properly. Inspectors from the building department also check to see that the plans are executed carefully.

UNDERSTANDING SKIMMING AND SURVEYING

Skimming is an art that has a definite place in the field of social studies. It is a kind of rapid reading, the simplest form of which is to locate a specific name, date, or single word, in lists or paragraphs. Comprehension of the entire selection is not involved here, for the "reader" remains oblivious to everything but his goal. Students who require corrective reading should receive instruction in this simple type of skimming. Students who are reading on grade level should be instructed in the more advanced types of skimming and surveying indicated by the problems described in Lessons I and II that follow. (Reference: Reading - Grades 7-8-9, pp. 45, 46.)

LESSON I

Problem: Students need instruction in locating the answers to specific questions without reading an entire selection.

Required Skill: Developing the ability to skim content material in order to locate answers to specific questions.

PROCEDURE	DEVELOPMENT
1. Write a specific question on the board and review the type of rapid reading which aids in locating the answers to who, what, where, and when questions.	1. Write on the board: Who was the first explorer to reach the new world? Q: How would you locate the answer to this question quickly? A: I would skim the material to locate a proper name which answers the question, who. Q: How would you locate the answers to questions that indicate where and when? A: I'd look for capital letters to answer where and numbers to answer when questions.
2a. Have students read the question carefully. State the "key" word that indicates the information required for the answer. Underline the "key" word.	2a. Say: Then the word who in this question is a key word because it indicates that the name of a person is required to answer it, and proper names begin with capitals.
b. Through questioning, have students identify other words in the question that act as guides to the information needed in the answer. Underline these words on the board.	b. Q: Are there any other words in this question that point to additional information needed to answer it? A: Yes. The words, first explorer, and new world, are guide words to the information needed.
3. Direct students to turn to a specific page in the text to find the information indicated by the underlined words in the question.	3. Say: Turn to page.... Skim the page quickly to find the name of the explorer. Remember that a name is the only detail for which you are looking.
4. Tell students to stop and check their answers by reading very carefully to determine whether or not they have located the correct answer to the specific question.	4. Say: Read the answer you have located very carefully to see if it answers the specific question.

PROCEDURE	DEVELOPMENT
	4. A: The first explorer to reach the new world was______. Q: Is the specific question answered? Why? A: The question is answered because we have located the name of the first explorer to reach the new world.
5. Have students examine other types of "key" words used in specific questions. List these "key" words on the board and indicate the the type of information each one designates.	5. Write on board: 1. How did the crew react to the long arduous voyage? (How designates manner.) 2. Why were the explorers looking for new trade routes to the east? (Why designates reason or cause.)
6. Review the procedures used in skimming to find the answer to a specific question. Write the steps on the board, or list them on a chart so that they may be used for recall.	6. Chart: 1. Read the question carefully. 2. Select the key words in the question that pinpoint the information needed to answer the question. Underline them. 3. Skim the material looking only for the information designated by the key words. 4. Stop and read the information located to see if it answers the specific question.
7. Using the steps listed in step 6 above, have students skim to find the answers to other specific questions.	7. Q: 1. Why was Spain so interested in financing many of the explorers' voyages? 2. How did the explorers man their ships?
8. Review the importance of skimming to find the answers to specific questions.	8. This type of skimming is an aid in locating specific information. It is a time saver.

LESSON II

Problem: Instruction is needed in determining quickly whether or not specific content material is relevant to a specific social studies problem.

Required Skill: Developing the ability to skim content material in order to determine its relevancy to a specific problem.

PROCEDURE	DEVELOPMENT
1. Write a social studies problem on the board, one for which pertinent content material is needed.	1. Problem: Why did Spain, France, and England each lay claim to the New World?
2. Have students examine the problem to locate the words that pinpoint the information this problem requires. Underline these words on the board.	2. Q: What clue does the word, why, give you in this question? A: The word, why, tells us that we should look for an answer that indicates a cause or a reason.

PROCEDURE	DEVELOPMENT
	2. Q: What clues do the words Spain, France, England, claim, each, and New World, give you? A: These words pinpoint the content required to solve the problem.
3. Direct students to turn to the table of contents in their texts[4] in order to locate the chapters listed under the unit to which the specific problem relates. Write the chapter headings and page numbers on the board.	3. Unit: Europeans Discovered Explored and Settled the Americas. Chapter I: Hunters from Asia Settled the Americas While Europeans Built Great Civilizations --pp. 2-27. Chapter II: Columbus' Discovery Opened a New World for Exploration--pp. 28-44. Chapter III: The French, Dutch, and English Explored North America and Founded Colonies-- pp. 45-65. Say: The table of contents is one organizational device authors use to aid you in locating specific information.
4. Indicate another device used by authors to assist students in using a text.	4. Say: There are other devices authors employ to assist you in using a text. For example, in this text, the author has placed a summary at the end of each chapter to highlight the important facts included in the contents of the chapter.
5. Have students turn to the summary of the first chapter and direct them to read it rapidly to get a general impression of its contents. Through questioning, elicit from students the answer to whether or not the contents of this chapter will help them solve the problem.	5. Say: Read the summary on p. 26 very quickly. Q: What is your impression of the contents of this chapter? Do you think it contains information on why Spain, France, and England each claimed the new world?--No--Why not? A: The summary indicates that this chapter contains information on America before the advent of the Spanish, French, and English.
6. Use the same procedures described in step 5 to determine whether or not the summaries of the other chapters indicate that they are pertinent to the specific problem.	6. Q: Skim the summaries on pp. 43 and 58. Do these chapters contain the information needed? A: Yes, because these summaries indicate that chapters II and III contain information about the Spanish, French, and English in the New World.

[4] Example in column 2 is from *The Story of Our Land and People* by Moon and Cline, Holt, Rinehart and Winston, 1961.

PROCEDURE	DEVELOPMENT
7. Refer to the chapters listed on the board and underline those which contain material pertinent to the problem. Draw students' attention to the fact that only some chapters contain pertinent material.	7. Say: Look at the chapter headings. Notice that although chapters I, II, and III are listed under the one unit title, skimming the summaries of the chapters enabled us to determine quickly that only chapters II and III include relevant material.
8. Reinforce the purpose and use of the type of skimming developed in this lesson.	8. Q: Of what value is this type of skimming? A: This type of skimming is an aid in: a. Locating materials pertinent to the solution of specific problems. b. Judging the relevancy of such materials quickly. c. Saving time in selecting suitable materials.

A Final Note

The preceding lessons help to develop the understanding that the rate of reading is flexible according to the purpose of the reading. We "race" over material while engaged in the location of "key" words, and we slow down to a "walk" when understanding of the content is required. For example, we "race" over material when making rapid and skilled use of book divisions, chapter headings, etc. and we slow down to a walk when finding answers to questions that include the language of the context. For locating answers to questions that do not include the language of the context, the rate is even slower.

READING CRITICALLY

The ability to read critically is of utmost importance to every student. This ability cannot be left to chance development. It must be taught systematically in order that students develop the ability to judge the validity of statements found in printed materials. Students must be shown how to recognize slanted writings and biased opinions as they read, in order to be able to distinguish them from facts which can be proven. The lesson that follows describes the procedures that may be used in the early development of this reading skill.

LESSON

Problem: Guidance is needed in judging the validity of statements that appear in students' daily readings.

Required Skill: Developing the ability to distinguish between fact and opinion.

	PROCEDURE		DEVELOPMENT
1a.	Read a statement, the same or similar to the one on the right.	1a.	"By 1970, the American population will probably pass the two hundred million mark. With this increase, we can anticipate problems related to housing, education, and conservation of natural resources." (From News of the Week in Review, "The New York Times.")
b.	Question students to determine whether this is a statement of fact or opinion. Have students defend their answers.	b.	Q: Do you believe this is a statement of fact? A: No, this is not a statement of fact. Q: Why not? A: This statement predicts future happenings that cannot be proven now. The word, probably, indicates a possibility for the future. This statement may be factual in 1970, but as of the moment, it is not a fact. Q: What would you say this statement expresses? A: This statement expresses an opinion of what someone believes may be true in 1970.
c.	Record student response on board.	c.	Write the word "opinion" on the board.
2a.	Read another statement to the class.	2a.	"The Federal Government spends about two billion dollars a year helping states with their aid to needy persons, needy through unemployment, disability, or family troubles." (From News of the Week in Review, "The New York Times.")
b.	Question students to determine whether this is a statement of fact or opinion. Have students defend their answers.	b.	Q: Do you believe this statement to be true? Why? A: Yes, this statement is true because it can be proven by using reliable sources that list the expenditures of the Federal Government.

PROCEDURE	DEVELOPMENT
	2b. (Continued) Q: What does this statement express? A: It expresses a fact that can be proven true.
2c. Record student response on the board.	c. Write the word "fact" on the board.
3. Question students about statements of fact and opinion they encounter in their daily readings. List answers on the board.	3. Q: Where in your daily readings do you find statements of fact and/or opinion? A: In newspapers, periodicals, etc. which have such features as: News Reports Market Results Editorials Letters to the Editor Political Speeches Advertisements
4. Explain to students that reporters use clue words to indicate that they are expressing opinions. Elicit from students a list of such clue words and write them on the board.	4. Say: Responsible reporters on reputable newspapers and magazines use clue words in their stories to indicate that they are expressing an opinion rather than a fact. Q: Think of some newspaper articles you have read. What words can you recall that indicated an opinion was being expressed? A: Claims, believes, thinks, considers, said to be, probable, etc.
5. Elicit from students the items listed in step 3 which might express opinions without clue words.	5. Q: Which of the newspaper features listed in in step 3 might possibly express opinions without the use of clue words? A: Advertisements, Newspaper Editorials, Political Speeches, etc. might omit clue words because these features generally do express opinions.
6. Review the definitions of a statement of fact and a statement of opinion.	6. Q: How would you define a statement of fact? A: A statement of fact is one which can be proven true by using a reliable source, such as an encyclopedia, world almanac, etc. Q: How would you define a statement of opinion? A: A statement of opinion is one that expresses the feelings, thoughts, or beliefs of a person or persons, and one which cannot be proven true in any reliable source.
7a. Present several statements to students, directing them to decide whether each statement expresses a fact or an opinion. Elicit reasons for their choice.	7a. 1. Scott Carpenter was the second American to orbit the earth. 2. I consider your article, "How the West Was Won," the best that has ever been written. 3. Scientists believe that a man may reach the moon in ten years.

PROCEDURE	DEVELOPMENT
7b. Check students' answers.	7b. Statements: 1. Fact--Can be proven in any reliable source. 2. Opinion--A person's belief cannot be proven in any reliable source. Clue word is consider. 3. Opinion--The belief of a group of people about future happenings cannot be proven at this time. Clue word is believe.
8. Review the importance of the ability to distinguish fact from opinion in daily readings.	8. Q: Why is it important to be able to distinguish between a fact and an opinion? A: The ability to distinguish between fact and opinion helps us to recognize slanted writings designed to influence our thinking.

A Final Note

Many skills are involved in the ability to evaluate and read critically. Some of them are at advanced levels of instruction. Teachers must instruct students in these additional skills:

1. Recognizing and questioning the validity of generalized statements.
   Example: The best cameras come from Germany.
2. Recognizing devices used to slant statements for the author's purpose.
   a. Words or phrases quoted out of context
   b. Irony or sarcasm
   c. Emotional language intended to prejudice
   d. Exaggerated claims
   e. Half-truths
   f. Testimonials from those not in authority to speak

Reference: Manual, Reading - Grades 7-8-9.

PROCEDURE	DEVELOPMENT
1b. Through questioning, elicit from students the reason they were able to locate the headings so quickly.	1b. Q: What made each of the headings stand out so that you noticed it quickly? A: Different kinds of type. Say: The author had a definite purpose in using the different kinds of type. Let's examine each heading very carefully to find out his purpose.
2a. Direct students to examine the unit heading carefully, and through questioning, establish how its style and size of type, and its position on the page indicate the importance of the content it introduces.	2a. Say: Look at the unit heading, **A NEW BIRTH OF FREEDOM.** Q: What kind of type is used? A: The unit heading is printed in black, bold-faced type. Q: Which letters are capitalized? A: Every letter is capitalized. Q: On what part of the page is it located? A: It is located at the top center of the introductory page of the unit. Q: What clue does this unit heading give you as to the content of the material it introduces? A: It offers a broad summary of the content of the entire unit.
b. Follow the procedures in step 2a. to establish the importance of the section headings and the paragraph headings.	b. Repeat the questions asked in 2a. to arrive at the following information: 1. The section headings are located off to the side and at the top of the page in black, bold-faced type, with every letter capitalized. Each section heading introduces one part of the content of the whole unit. 2. The paragraph headings are printed in black, bold-faced type, with the first letter of each word capitalized. Each paragraph heading introduces the content of the paragraphs that follow it. Each paragraph heading relates to the section heading that introduces it.
c. Through questioning, have students note the relationship that exists between the following headings:	c. Say The entire contents of the unit, **A NEW BIRTH OF FREEDOM**, are divided into three sections. Each section is headed as follows: **A NATION DIVIDED** **ONE NATION OR TWO** **ONE NATION INDIVISIBLE**
1. Section Headings to the Unit Heading	1. Say: Examine the section headings included under the unit heading. Q: Is there any relationship between the above section headings and the unit heading? A: Yes. The three section headings relate to the unit heading because each one suggests information about a new birth of freedom.

PROCEDURE	DEVELOPMENT
2c. 2. Paragraph Headings to the Section Headings	2c.2.Say: Examine the paragraph headings included under this specific section heading: **A NATION DIVIDED** **The Manufacturing North and the Agricultural South** **Slave States or Free States** **States Rights** **Immediate Abolition** Q: Do you see any relation between the paragraph headings and the section heading? A: Yes. The four paragraph headings relate to the section heading because each one suggests one part of the content introduced by the section heading, **A NATION DIVIDED.**
3. Follow the procedures used in step 2 to show the relationship between other paragraph headings and the section headings that introduce them.	3. See section headings and paragraph headings listed in step 1a.
4. Have students re-examine the different kinds of headings contained in this unit, and show them how these headings offer an outline of the contents of the entire unit. Explain the following similarities: The Unit Heading to a title The Section Headings to topics that relate to the title The Paragraph Headings to sub-topics that relate to the section headings	4. Unit heading (Title) I. Section heading (Topic) A. Paragraph heading (Sub-Topic) B. Paragraph heading (Sub-Topic) C. Paragraph heading (Sub-Topic) II. Section heading (Topic) A. Paragraph heading (Sub-Topic) B. Paragraph heading (Sub-Topic) C. Paragraph heading (Sub-Topic) III. Section heading (Topic) A. Paragraph heading (Sub-Topic) B. Paragraph heading (Sub-Topic) C. Paragraph heading (Sub-Topic)
5. Review the purpose of using an author's "printing clues" when organizing a long unit of content.	5. Q: How can understanding the author's "printing clues" help you organize a long unit of content? A: a. The "printing clues" offer a broad view of the contents of the entire unit. b. The "printing clues" aid in outlining the material for quick recall of its content.

Note: This lesson may be developed in two parts. Steps 1, 2, 3, in one lesson, and steps 4 and 5, introducing outlining, in a second lesson.

A FINAL NOTE

In different texts, students will find other types of "printing clues" used by authors. For example, in the text, Exploring New York, third edition, published by Harcourt, Brace, and Co., the authors, B. M. Wainger, D. W. Furman, and E. B. Oagley, use the following type of organizational device as "printing clues" to the contents of the text:

THE IROQUOIS: People of the Long House	(Chapter Heading)
THE IROQUOIS	(Section Heading)
Reasons for Iroquois Success	(Paragraph Heading)
Iroquois Victories	(Paragraph Heading)
The Five Nations Confederacy	(Paragraph Heading)
INDIAN TRAVEL	(Section Heading)
Indian Trails Parallel Waterways	(Paragraph Heading)
The Great Iroquois Trail	(Paragraph Heading)
INDIAN INDUSTRY AND AGRICULTURE	(Section Heading)
Resources of the Land	(Paragraph Heading)
Indian Industry	(Paragraph Heading)
Men and Women Share the Work	(Paragraph Heading)
Indian Wampum	(Paragraph Heading)
The Uses of Wampum	(Paragraph Heading)

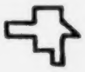
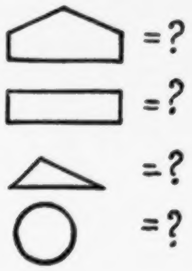
By examining the "printing clues" in the various headings above, it is evident that both by the size and style of type, and by the position of the heading on the page, the Chapter Heading gives a clue to the content of the whole chapter, the Section Headings give clues to the contents of the three parts or sections into which the chapter is divided, and the Paragraph Headings give clues to the contents of the paragraphs that relate to the Section Headings. Thus a broad view of the contents of the whole chapter is provided by an understanding of the organizational devices used by these authors. (Printing clues.)

LESSON II

Problem: It is evident that instruction is needed in reading and interpreting graphic materials.

Required Skill: Developing the ability to read and interpret maps.

PROCEDURE	DEVELOPMENT
1a. Direct students to read the title of a wall map or a map in their texts, the same as, or similar to the one to the right.	1a. Title: Physical-Political UNITED STATES (Wall map published by A. J. Nystrom & Co., Chicago, Illinois)
b. Through questioning, clarify the difficult vocabulary in the title and elicit from students the meaning of the title.	b. Q: In the title of this map, what would you say the word physical means? A: The word physical in this title means that this map indicates the way nature formed the United States - its highlands, its lowlands, etc. Say: Consider the word political. One dictionary meaning of the word political is: of or pertaining to the government. Q: Who decides on the government of our country? A: The people decide on the government.

PROCEDURE	DEVELOPMENT
	1b. Say: Then in the map title the word political must refer to something done by the people of the United States. Q: What do you think this reference means? A: It means that the people did something to the land. For example, man made certain divisions or boundaries of the United States and this map indicates these divisions. Q: What do we now know about this map just from reading and fully understanding the title? A: This title indicates that the map shows both the nature-made formations and the man-made divisions or boundaries of the United States.
2a. Have students examine the map. Through questioning, elicit the fact that this map contains some familiar symbols. (See examples to the right.)	2a. Q: As you examine this map, what symbols do you find with which you are familiar? What do they mean? A: Heavy black lines---boundary lines that separate the states (man-made). Black dots---important cities such as New York, San Francisco, etc. (man-made). Circles with a dot in the center---the capital of each state (man-made).
b. Elicit the fact that this map contains other symbols which are not familiar to students.	b. Q: What symbol do you find next to New York City? A:  Q: Are you familiar with the meaning of that symbol? A: No. Q: Do you see any other symbols with which you are not familiar? A: There are several symbols with which we are not familiar, such as: Examples: 1.  2. There are several different colors used on this map: brown, orange, gold, yellow, and three shades of green.

PROCEDURE	**DEVELOPMENT**
	2b. A: (Continued) Say: These unfamiliar symbols used on the map have meaning which we must understand in order to read and interpret this map correctly.
3. Have students examine all areas surrounding the map to locate the "key" or "legend" that tells the story of the symbols found on the map.	3. Say: Look at all the areas around the map to see if you can find the "key" that will unlock the meaning of these unfamiliar symbols. This key is called a legend because it tells the story of the map. Q: Have you located the key or legend? A: Yes. Q: Where is it? A: It is in the lower left hand corner of the map.
4. Have students study the legend which unlocks the meaning of the following unfamiliar symbols:	4. Say: Note that the legend to these symbols is divided into two parts. One part explains the meaning of the unfamiliar figures and the other part explains the meaning of the various colors.
a. The geometric figures found on the map	a. Q: What do the different figures represent? ✚ Cities with over 1,000,000 population ⬠ 500,000 to 1,000.000 ▭ 100,000 to 500.000 △ 50,000 to 100.000 ○ less than 50,000 Q: Do these figures give physical or political information about the U.S.? Why? A: These figures give political information because they are concerned with population and not with anything formed by nature.
b. The colored portions on the map	b. Say: Look at the color key. Q: What do the different colors represent? A: Brown - Land over 10,000 ft. high Orange - 5,000 to 10,000 ft. Gold - 2,000 to 5,000 ft. Yellow - 1,000 to 2,000 ft.

PROCEDURE	DEVELOPMENT
	4b. A: (Continued) Pale Green - 500 to 1,000 ft. Medium Green - 0 to 500 ft. Dark Green - below sea level Q: Do these colors give physical or political information about the U.S.? Why? A: These colors give physical information because they are concerned with nature-made formations of the U.S.
5. Direct students to re-examine the "key" carefully.	5. Say: Study the meanings of the geometric figures carefully.
a. Through specific questions, lead students to apply the meanings of the geometric symbols to those appearing on the map.	a. Q: What does the triangle represent? A: Cities with 50,000 to 100,000 population. Say: Locate triangles on the map. Example: Macon, Georgia. Q: What do we know about this city? A: Macon has a population range between 50,000 and 100,000. Apply the meanings of the remaining figures in the "key" to those appearing on the map. (At this point the teacher may give instruction in 5a only, the population key, and reserve 5b, the color key, for a subsequent lesson.)
b. Direct students to apply the meanings of the different colors to those appearing on the map.	b. Say: Study the meanings of the colors in the key. Q: What does the color "brown" represent? A: Land over 10,000 ft. high. Say: Locate the color "brown" on the map. Example: Mt. Whitney - "brown." Q: What does the "brown" color indicate about Mt. Whitney? A: It shows that Mt. Whitney is over 10,000 feet in height. Continue to apply the meanings of the remaining colors to those appearing on the map.
6. Review steps one through five. Write the steps on the board or put them on a chart which may be used as an aid in map reading.	6. Chart-Steps in Map Reading 1. Read the title to determine what the map represents. 2. Examine the map and note the symbols used on it. 3. Locate the "key" or "legend" that explains the meaning of these symbols. 4. Study the meaning of the symbols. 5. Apply the meaning of the symbols to those that appear on the map.

PROCEDURE	DEVELOPMENT
7. Using the steps listed in No. 6, have students read and interpret another map.	7. Map Title: Transportation Unites Nation (The Story of American Democracy, Casner and Gabriel, third ed., Harcourt and Brace Co., Inc., 1955, p. 256.)
8. Summarize the lesson by questioning students about the importance of the ability to read and interpret maps.	8. Q: Why is it important to be able to read and interpret maps? A: Maps give specific information. This information may be interpreted more quickly from map reading than from reading printed materials.

A Final Note

Separate lessons are required to give students an understanding of the scale of miles to which a map is drawn. Students need this instruction in order to acquire correct concepts of the approximate size of land represented by the map and the approximate distance between any two given points on the map. For example, if the scale of miles to which a map is drawn is 100 miles to an inch, and the widest area across the map measures approximately 30 inches, then it follows that the land is approximately 3,000 miles wide. Again, on this same map, if the distance between two cities, New York and Chicago, measures approximately 10 inches, then the distance between New York City and Chicago is approximately 1,000 miles.

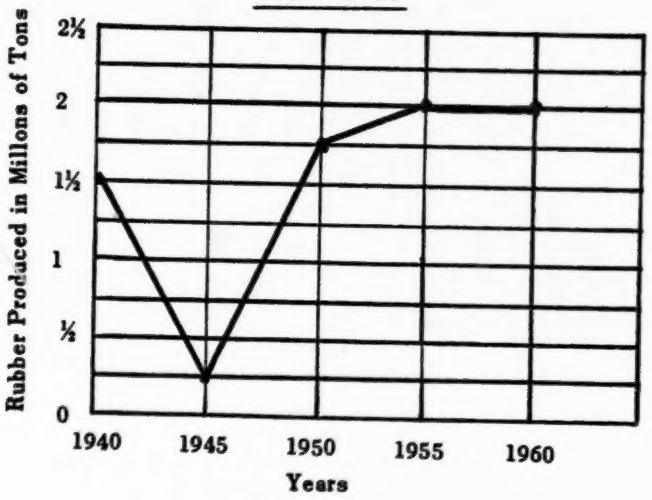
LESSON III

Problem: Students fail to use the information contained in different types of graphic materials found in their social studies texts.

Required Skill: Developing the ability to read and interpret a graph in social studies.

Note: An understanding of the vocabulary pertinent to this lesson must be developed before the lesson is taught. For example, the meaning of the terms, vertical axis, horizontal axis, interval value, etc. must be made clear to students in preparation for giving this lesson.

PROCEDURE	DEVELOPMENT
1a. Write a paragraph on the board which contains information on the amount of production of a specific product over a given number of years. (Paragraph may be from texts, or other materials, which may be rexographed or written on the board.) Have students read paragraph silently and ask questions pertinent to the paragraph.	1a. Say: Read the following paragraph silently: The World Almanac reported on the world production of natural rubber over a twenty year period. At five year intervals, the following statistics were noted: In 1940, 1,399,000 tons were produced. In 1945, production dropped to 272,000 tons. In 1950, production rose to 1,842,500 tons, and in 1955, to 1,912,500 tons. By 1960, it reached 2,000,000 tons. What was the amount of production in 1940? 1950? 1945? How did production in 1945 compare with production in 1955? 1955 with 1960? (Statistics in World Almanac, 1964 ed., p. 716.)

PROCEDURE	DEVELOPMENT
b. Through questioning, elicit from students possible difficulties that might be encountered in remembering the facts stated in the paragraph.	b. Q: Why do you think a paragraph similar to the one you read might cause you difficulty? A: The paragraph is very long. We'd have to keep reading the same parts over and over again in order to answer the questions requiring a comparison of the amount of production of one year with another, and in determining the year the amount of production was the greatest, the lowest, etc.
c. State that the information contained in paragraphs of this type can be remembered more easily if the facts given in the paragraphs are presented in the form of a graph which can be read and interpreted.	c. Say: All the facts in the above paragraph can be shown on a graph and there are clues which can be used as guides to reading and interpreting the graph. (To simplify plotting the information on the graph, the production figures have been rounded off to the nearest 1/4 million.)
2. Present a graph similar to that at the right.	2. Graph: World Production of Natural Rubber 1940 - 1960 
3. Direct students to examine the title of the graph and question to elicit the information given by the title. (clue a)	3. Say: Examine the title of the graph. Q: What clue to the meaning of the graph does the title give you? A: The title offers a broad clue to what the graph represents. (World Production of Natural Rubber over a given number of years.)
4. Have students read the printed material along the vertical axis of the graph and question to determine the clue this material offers to interpreting the graph. (clue b)	4. Q: What clue does the printed material along the vertical axis give to the meaning of the graph? A: The material along the vertical axis gives information about the tons of rubber produced, expressed in millions of tons.

PROCEDURE	DEVELOPMENT
5. Through questioning, develop an understanding of the scale or interval value used along the vertical axis. (clue c)	5. Q: What is the interval value or scale along the vertical axis? A: The scale or interval value is 1/4 million. Q: Where is 3/4 million located on the vertical scale? A: The location of 3/4 million is half-way between 1/2 million and 1 million. (Point to it.)
6. Have students read the printed material along the horizontal axis and question to determine the clue this material offers to interpreting the graph. (clue d)	6. Q: What clue does the printed material along the horizontal axis give to the meaning of the graph? A: The printed material along the horizontal axis gives the years 1940 through 1960, at 5 yr. intervals, for which years the amount of production is recorded on the graph. (Information suggested by title.)
7. Direct students' attention to the dots on the graph and question to elicit the meaning of these dots. (clue e)	7. Say: Examine the graph closely. Q: What information do we get from the dots? (Point to them.) A: The dots associate the year with the amount of production of rubber for that year. For example, the first dot indicates the amount of rubber produced in millions of tons in 1940. The second dot indicates the amount of rubber produced in millions of tons in 1945, etc., etc. (Point to dots.) Say: Look at the graph again. Q: What do the line segments connecting the dots show? A: The line segments that connect the dots indicate at a glance the rising or falling trend in the production of rubber in the year 1945, 1950 etc. (Point to line segments.)
8. Have students answer questions concerning facts, comparisons, and trends indicated on the graph.	8. Q: 1. What was the amount of production in 1940, 1960, etc.? 2. How does the amount of production in 1950 compare with the amount of production in 1945? 3. What is the trend in the amount of production from the year 1950 through 1955? Is it a rising trend or a falling trend? 4. In what year is the amount of production the greatest? The lowest? etc.
9. Elicit from students the value of the ability to read and interpret a graph.	9. Q: What is the value of reading a graph? A: It is easy to see at a glance the information a graph offers. For example, comparisons and trends can be noted almost instantly.

PROCEDURE	DEVELOPMENT
10. Review the clues to reading and interpreting a graph developed in the procedures. Write the clues on a chart (newsprint) in order that students may refer to them whenever necessary. (Prepare in advance of the lesson.)	10. Chart-Clues to Graph Reading a. The title of the graph b. The printed material along the vertical axis c. The printed material along the horizontal axis d. The interval value or scale along the vertical axis and the horozontal axis e. The dots which represent the information on the graph

A Final Note

The clues to reading and interpreting a line graph listed in step 10 of the preceding lesson may also be used to develop the ability to read and interpret bar graphs. The teacher just substitutes the word "bar" for the word "dots" in clue e, and proceeds to develop the skill.

LESSON IV

Problem: Guidance is needed in the efficient use of reference books as reliable sources of information.

Required Skill: Developing the ability to use an encyclopedia efficiently. (Arrange with librarian in advance for use of the library and its facilities.)

PROCEDURE	DEVELOPMENT
1. Write a topic on the blackboard for which students are required to find additional sources of information.	1.Topic: Find additional information on the International Relations of the United States with Argentina in the early 1950's.
2. Through questioning, elicit from students different sources in which information on this topic may be found. State the purpose of this lesson.	2. Q: Where do you think we can find additional information on this topic? A: Encyclopedia, World Almanac, etc. Say: Today we shall learn how to use an encyclopedia efficiently.
3a. Write the name of a set of encyclopedia on the blackboard.	3a. Collier's Encyclopedia (yearbook issued every year to keep contents up to date).
b. Show students where the publication date is located.	b. Publication date - 1956 - located on the back of the title page.
c. Through questioning, determine the importance of this date.	c. Q: Why is it so important that we know the publication date of the encyclopedia? A: The publication date is a guide to the time element of the information contained in the encyclopedia. For example, information on a current orbital flight could not be located in this encyclopedia published in 1956 because the current orbital flights had not occurred at the time of publication.

PROCEDURE	DEVELOPMENT
4a. Indicate the number of volumes in this set of encyclopedia.	4a. Say: There are 20 volumes included in Collier's Encyclopedia.
b. Use the blackboard to illustrate the information printed on the binding of each volume.	b. The binding of each volume indicates the number of the volume and the initial letters of the topics included in the volume. Example: U ZWO 19
c. Show students where the index for this set of encyclopedia is located.	c. The last volume, Number 20, contains the index to the contents of the other 19 volumes in the set.
5. On the blackboard or chart, explain the organization of the index to students. Stress the following points: a. The arrangement of the index.	5. Say: a. The index is arranged alphabetically by topics. Some topics are divided into related sub-topics, also alphabetically arranged. Sub-topics may be divided into related sub-sub-topics.
b. The purpose of the guide words on each page.	b. Guide words are located at the top of each page, indicating the range of topics covered on the page. Example: Marlboro, N. H. to Marshall, Texas
c. The method used to indicate where in the set specific information is located.	c. The volume number is indicated in the index in large, black print. The page numbers are indicated in a smaller, lighter print. Example: **9**-362
d. The use of the dash and the semi-colon.	d. A dash is used to separate volume number from page number. Example: **7**-156 A semi-colon is used to separate different volumes and page numbers where information is located. Example: **6**-302; **5**-101; indicates that information on one topic may be found on Page 302 in Volume **6** and on Page 101 in Volume **5**.
	Note: At this point the teacher may terminate the lesson and develop steps 6 through 9 in a subsequent lesson.
6. Refer students to the topic on the board, and through questioning, elicit from them the "key" words in the problem which act as guides to locating required information.	6. Problem on Board: Find information on the International Relations of the United States and Argentina in the early 1950's.

PROCEDURE	DEVELOPMENT
6. Examples: a. The "key" word which points to the main topic on which information is sought.	6. a.Q: Which word do you consider the most important "key" word in the problem? Why? A: The United States is the most important "key" word because the other words tell what kind of information is required about the United States. Say: Then the United States is the topic which must be located in the index.
b. The "key" word or words that point to information related to the main topic. (sub-topic and sub-sub-topics).	b.Q: Exactly what information is required about the United States? A: Her international relations (sub-topic). Q: The problem requires information about the international relations of the U.S. with what country and in what year? A: Argentina, in the early 1950's (sub-sub-topic). Q: Do you think we may be able to find this information in this set of encyclopedia, published in 1956? Why? A: Yes, this information may be included in this encyclopedia because the problem mentions the early 1950's which is before publication date.
c. Underline the "key" words in the problem on the board.	c. Say: Now we are ready to locate the volume numbers and the page numbers which contain information on the following underlined "key" words: The International Relations of the United States with Argentina in the early 1950's.
7a. Copy on blackboard a small portion of the index, similar to that at the right.	7a. P. 889 in Volume **20** United States of America Finance (with detailed listings) Geography Government and Politics Government Departments Health and Welfare History Industry International Relations **6**-480d; Afganistan **1**-140b; Ambassador **1**-437e; Arbitration **2**-107b; Argentina **2**-202d; **2**-208d; Atomic Weapons, etc.
b. Direct students to locate in the index the volume numbers and the page numbers that contain information on the topic. Question students to check on their answers.	b. Q: Where in this set of encyclopedia may we find information on the topic? A: Information on the International Relations of the U.S. and Argentina is located on Page 202d and Page 208d in Volume **2**.

PROCEDURE	DEVELOPMENT
8. Explain to students the way this index designates the specific part of a page that contains information. Use the blackboard to illustrate this.	3. Say: We must find out what the letter d means after Page 202. Look at the sample page. Page 202 a c b d Q: What do you think Page 202d means? A: Page 202d means that the information is located on the bottom half of column 2 on Page 202.
9. Summarize the lesson by highlighting the important points students must recognize and understand in order to use the encyclopedia efficiently.	9. Q: What are some of the important points you must recognize and understand in order to use the encyclopedia efficiently? A: a. Know the importance of the publication date and where to locate it. b. Know where the index is located and understand its arrangement. c. Know how to locate the volume number and the pages which contain specific information.

A Final Note

As indicated, it may be necessary to develop the preceding skill in two lessons. If this is so, it is suggested that the procedures outlined in steps one through five are developed in the first lesson, with the teacher summarizing the highlights up to that point. In the second lesson, the teacher briefly reinforces the previous learnings and follows the procedures outlined in steps six through nine to develop the skill.

CONCLUSION

Social Studies experts are concerned with reading as a means of acquiring knowledge. Studies have shown that subject matter competence increases as a result of direct instruction in the reading skills.

These "reading in social studies" lessons were made specific by gearing them, for the most part, to specific units of content listed in the social studies syllabus. However, if the problem described in each lesson arises in any classroom, and the need for instruction in the reading skill is evident to the teacher, then the teacher merely substitutes his own examples and develops the needed skill.

The lessons included in this chapter suggest procedures for the direct teaching of the skills starred below. Many of the other skills are treated elsewhere in this publication. (See Reading Skills Check List.)

Vocabulary, Comprehension, and Work Study Skills

* recognize and understand vocabulary
* select main idea
* skim and survey
follow directions
* interpret pictures, maps, tables, graphs
note sequence of ideas and facts
* read critically, infer, conclude, distinguish fact from opinion, retain and recall

* organize material
  classify facts
  outline
  summarize
* use textbook aids
* use reference aids

CHAPTER II

TEACHING READING IN SCIENCE

As students advance scholastically and their science interests grow, a large proportion of science learning takes place through reading books. It therefore becomes the responsibility of the science teacher to give students instruction in those reading skills which are specifically pertinent to science so that students may derive optimum benefits from their science readings. This need for direct reading instruction is stated on page 12 in the science syllabus, General Science - Grades 7-8-9. The syllabus lists a series of textbook lessons which the science teacher may attempt. These lessons include the following skills:

1. Identify key words in a problem and locate applicable materials in the index.
2. Use the table of contents, the glossary, pictures, diagrams, and topical headings.
3. Find the main idea of a paragraph.
4. Formulate statements from reading.
5. Skim for main idea.
6. Select printed material relating to a problem.
7. Take notes or make outlines.
8. Arrange and organize ideas.

Although the language arts teacher is primarily responsible for instructing students in the reading skills inherent in the preceding lessons, the skills may not have been applied to science materials. Therefore, if the need for instruction in a specific skill becomes evident to the science teacher, then the science teacher must give students direct instruction in that specific skill. The teacher may refer to the lessons listed in the Reading Skills Check List. Although the material used to develop the procedures in these lessons is not science material, the teacher merely substitutes science content to develop those procedures which specifically relate to the required reading skill.

The lesson plans that follow suggest procedures the science teacher may use to develop some of the reading skills pertinent to the science area:

1. The ability to recognize and understand the meaning of technical science vocabulary.
2. The ability to read and interpret science diagrams.
3. The ability to read and follow printed directions.
4. The ability to understand the purpose and use of organizing and classifying facts in science.

UNDERSTANDING SCIENCE VOCABULARY

Science has its own terminology which must be made meaningful to students. If science vocabulary is not clearly understood, then it follows that full comprehension of science content is lost to students. The lesson plan that follows suggests procedures which the science teacher may use to develop recognition and understanding of specific science vocabulary contained in a science text.

LESSON I

Problem: A portion of a science text assigned for homework contains difficult words which must be clarified if students are to comprehend the contents of the assignment.

Required Skill: Developing recognition and understanding of science vocabulary through the use of a specific contextual clue. (Definition included in the text.)

PROCEDURE	DEVELOPMENT
1. Write on blackboard one sentence containing a difficult science word. Include in the sentence the definition of the difficult word. Underline the word.	1. Sentence: The cornea is a thin transparent covering over the front of the eyeball.
2. Have sentence read aloud and question students to determine the meaning of the underlined word from the contextual clue in the sentence. (Definition) Underline meaning on the board.	2. Q: What does the word cornea mean? How do you know the meaning? A: The word cornea means a thin transparent covering over the front of the eyeball. The sentence contains a definition of the word cornea.
3. Write the word and its meaning on board or chart.	3. Board or Chart: cornea - a thin transparent covering over the front of the eyeball.
4. Follow steps 1, 2, and 3 to develop the meaning of additional difficult words included in the science assignment. Use examples similar to those at the right to determine recognition of the definitions of the words contained in the context.	4a. The iris is the colored portion of the front of the eye. b. The pupil is a hole in the middle of the the iris which allows light rays to enter the eye. c. The lens, located directly behind the pupil of the eye, focuses the image of what you see on the inside of the eye. d. The inside coating of the eyeball, made up of a delicate membrane of nerve cells, is called the retina.
5. State that authors often include definitions of new words right in the text itself. Through questioning, have students check their texts to see if definitions of new words are included in the text.	5. Q: Examine the part of the text assigned for homework. Are definitions of new words included in the text? A: Definitions of new words are or are not included in the text students are using. (May vary according to text used.)

PROCEDURE	DEVELOPMENT
6. Question students to determine where they may locate definitions of new words if the text does not include their definitions.	6. Q: Where may you locate the definitions of new words if their definitions are not included in the context? A:a. Word lists at end of chapters or units in texts. b. Glossary located just before the index at the back of the book. c. Dictionary - if no word lists or glossaries are located in texts, or, if the specific word does not appear in the lists or glossary.
7. Review the difficult words and their meanings developed in this lesson. Question to determine the need for understanding the vocabulary before attempting to read the content material that includes this vocabulary.	7. Science words and meanings: cornea, iris, pupil, lens, retina (meanings of words are in preceding steps 2, 3, and 4). Q: Why is it necessary to understand the vocabulary before attempting to read science content material? A: If the science vocabulary is not understood, then the content of the material cannot be fully comprehended.

A Final Note

The meanings of numerous science terms may be recognized if familiar portions of the terms are recognized and understood. Such words as hygrometer, thermometer, barometer, etc. may be understood if the familiar portion in each word, meter, meaning an instrument that measures, is recognized. Each of the above words is an instrument that measures something: hygrometer measures moisture in the air, thermometer measures heat, barometer measures air pressure. For detailed procedures that may be used to develop the ability to analyze the structure of words, see the appendix to this manual.

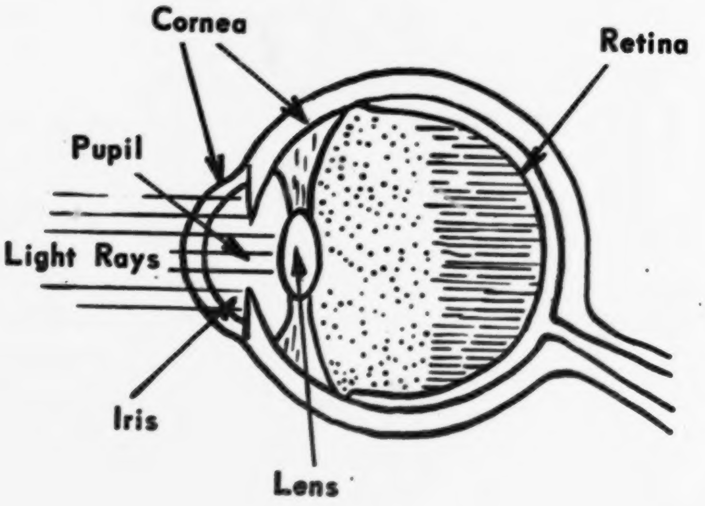
READING AND INTERPRETING GRAPHIC MATERIALS

Science texts contain various types of graphic materials, such as, maps, diagrams, tables, etc. Each type of graphic material has its own specific purpose and use. Direct instruction in reading and interpreting these graphic materials is essential if students are to develop facility in using the information offered by these materials. In the lesson that follows, procedures are listed which the science teacher may use to develop skill in reading and interpreting a specific science diagram. The vocabulary pertinent to understanding this diagram has been developed in advance. (See preceding vocabulary development lesson for details.)

LESSON II

Problem: The science text contains diagrams, the purpose and use of which must be made clear to students.

Required Skill: Reading and interpreting a diagram.

PROCEDURE	DEVELOPMENT
1. Direct students to turn in texts to a specific diagram, the same as or similar to that at the right. (Use charts, models, or rexographed materials if text contains no diagrams.)	1. *Diagram: 
2. Have students read the title or heading of the section of the text that contains the diagram. Question to determine the clue to the meaning of the diagram offered by this title or heading. (clue a)	2. Title of Section of Text: "How You See" Q: What clue to the meaning of the diagram is offered by the title or heading? A: The diagram must contain information about the eye. (In many texts, each diagram has its own title which may be used as the first clue to reading the diagram.)

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*This is a reproduction of diagram No. 51 on p. 92 of *You and Your World* (by Brandwein, Hollingworth, Beck, and Burgess; published by Harcourt, Brace and Co., 5th edition, October, 1958). The diagram is related to the topics, "How Do We Use Light in Communications?" and "How Does the Eye See?" in Unit II: Improving Communications (p. 199 in General Science: Grades 7-8-9, Curriculum Bulletin No. 4, 1958-59 Series).

PROCEDURE	DEVELOPMENT
3a. Have students examine the diagram briefly, and through questioning, elicit from students the meaning this diagram has for them.	3a. Say: Look at the diagram. Now look at your neighbor's eyes. Q: Do your neighbor's eyes look like the eye in the diagram? Why not? A: No. This diagram shows a side-view of the entire eye including parts that cannot be seen by looking at the eye from the outside.
b. Question to elicit the terms and symbols found on the diagram. (clue b)	b. Q: What parts of the eye are labeled on the diagram? What symbol is used to show where each part is located? A: The diagram shows the cornea, the iris, the pupil, the lens, and the retina of the eye. An arrow is used to show where each part of the eye is located.
4. Review the definition of the various terms developed in previous vocabulary lesson.	4. Say: We now know where the different parts of the eye are located. Q: What is a definition for each part? (previously learned) A: cornea - a thin transparent covering over the front of the eyeball. iris - colored portion of the front of the eye. pupil - a hole in the middle of the iris which allows light rays to enter. lens - located behind the pupil, focuses the image of what you see on the inside of the eye. retina - inside coating of eyeball, made up of a delicate membrane of nerve cells.
5. Have students read the surrounding text that refers to the diagram. Question to elicit additional information related to the diagram. (clue c)	5. Say: Read the text immediately to the right of the diagram. (The part of the text that relates to a diagram may be found in any of the surrounding printed material.) Q: What additional information have you learned about the different parts of the eye as shown in the diagram? A: cornea - protects the iris and pupil of eye. iris - muscles in the iris control opening and closing of the pupil of the eye. pupil - gets smaller in strong light and larger in dim light. lens - does not magnify the size of objects as does a magnifying lens. retina - on it is the image of thing you are observing - image brought to brain by a large nerve.

PROCEDURE	DEVELOPMENT
6. Through questioning, elicit from students the reason the author included the diagram in this part of the text.	6. Q: Why did the author include this diagram in this part of the text? A: The diagram enables us to see at a glance the location of the parts of the eye that are described in detail in the contents of the text.
7. Review the clues to reading and interpreting a diagram developed in this lesson. List clues on board or place them on a chart for future use. Have students apply the clues to reading another diagram.	7. Chart or Board: Clues to Reading a Diagram. a. The title of the section of the text that includes the diagram, or the title of the diagram. b. The terms and symbols shown on the diagram. c. The explanation of the terms and symbols found in the surrounding text. Say: Use the above clues to read and interpret the diagram on p.--- in your texts. (Teacher selects the diagram for this assignment.)

A Final Note

The science teacher may wish to instruct students in reading and interpreting additional types of graphic materials pertinent to science. For example, the teacher may wish to develop the ability to read and interpret a weather map or to read and interpret a graph. Suggested procedures for developing skill in map reading are located in the social studies part of this manual, as are those for developing the ability to read and interpret a graph. (See Reading Skills Check List for pages on which these lessons are located.)

READING AND FOLLOWING PRINTED DIRECTIONS

Experimentation forms a vital part of science learning. Science experiments include the recognition and understanding of many reading skills. Students must know how to read and follow printed directions. Students must understand the importance of following directions in sequential order. Students must know how to perceive relationships and draw conclusions as a result of observations made during the experiment. Direct instruction is essential in order to develop each of the preceding skills. The lesson that follows suggests procedures the science teacher may use to develop the ability to read and follow the directions involved in performing a specific experiment. In preparation for this lesson, the vocabulary must be clarified in advance. The meanings of such words as nutrient, protein, etc. must be clearly understood if the lesson is to be meaningful to students. The teacher may substitute simpler or more difficult examples depending on the needs and ability levels of students. However, the procedures in Column I remain the same for developing the skill of following directions.

LESSON III

Problem: Performing science experiments requires a type of careful reading in which the need for direct instruction is indicated.

Required Skill: Reading and following the printed directions contained in a specific science experiment.

PROCEDURE	DEVELOPMENT
1. Direct students to open textbooks to a specific science experiment, the same as or similar to that at the right.	1. Science Experiment: Part I How can we test for the nutrient, starch? Partially fill a test tube with water. Add a pinch of the nutrient starch. (Use corn-starch or flour.) Add a few drops of dilute tincture of iodine to the starchy solution. Observe that the starchy solution turns a distinctly purple-black color on contact with the iodine. Place this test tube in a test tube rack. Partially fill five additional test tubes with water. Into each add one of the following nutrients: simple sugar (use dextrose); fat or oil; protein (use hard-boiled egg white); a vitamin C pill (crushed); a mineral (use salt). Label each test tube and place it in the rack. Add a few drops of dilute tincture of iodine to each of the labeled test tubes. Observe that none of the nutrients in the labeled test tubes turns purple-black on contact with the iodine. Conclude that only the nutrient, starch, turns a distinctly purple-black color on contact with iodine.
2. Have students read the whole experiment silently. Question to elicit the general impression formed by this first reading. (Guide 1)	2. Q: Describe briefly what this first reading indicated to you.

PROCEDURE	DEVELOPMENT
	2. A: This reading indicated: a. A problem to solve b. Materials needed to solve the problem c. Directions to follow to solve the problem d. A conclusion to draw from the solution of the problem
3. Direct students to re-read the experiment carefully until they locate the problem to be solved. Through questioning, determine the location of the problem in the printed material. (Guide 2)	3. Q: What is the problem? Where is it located in the printed material? A: The problem is "How can we test for the nutrient, starch?" It is stated in the first sentence.
4. Have students continue reading carefully to locate the material needed to solve the problem. Question to elicit the various types of materials required and list them on the board. (Guide 3)	4. Q: What materials are needed to solve the problem? A: Materials needed: six test tubes, one test tube rack, water, cornstarch or flour, dilute tincture of iodine, one dropper, dextrose, fat or oil, hard-boiled egg white, one vitamin C pill, salt, labels.
5. Direct students to read carefully in order to understand the directions they must follow to solve the problem. List directions on the board in an abbreviated form. (Guide4)	5. Q: What directions do we have to follow in order to solve the problem? A: 1. Partly fill one test tube with water. 2. Add pinch cornstarch or flour. 3. Add few drops dilute tincture of iodine. 4. Place test tube in rack. 5. Observe purple-black color of starch solution on contact with iodine. 6. Partly fill 5 additional test tubes with water. 7. Into each test tube add one of the following nutrients: dextrose, fat or oil, hard-boiled egg white, a crushed vitamin C pill, salt. 8. Label each of five test tubes and place in rack. 9. Add few drops dilute tincture of iodine to each labeled test tube. 10. Observe that no nutrient in labeled test tubes turns purple-black on contact with iodine. 11. Conclude that only one nutrient, starch, turns purple-black on contact with iodine.
6. Question to elicit from students the importance of following directions in sequential order. (Guide 5)	6. Q: Which directions must you follow in order to make the observation in direction 5? (Observe that the starchy solution turns purple-black on contact with iodine.)

PROCEDURE	DEVELOPMENT
	6. A: We must follow directions 1, 2, 3, and 4 before we can make such an observation. Q: Which directions must precede the observation made in direction 10? (Observe that no nutrient in labeled test tubes turns purple-black on contact with iodine.) A: Directions 6 through 9 must be followed before such an observation can be made. Q: Do you understand the importance of following directions in the order in which they are given? Why is it important? A: In order to bring a problem to a successful conclusion, directions must be followed in sequential order. This also prevents the omission of any important part of the experiment.
7. Have students read to understand the conclusion drawn as a result of following the directions in this experiment. Question to determine the solution of the problem. (Guide 6)	7. Q: What conclusion is drawn as a result of following the directions in this experiment? A: The conclusion is that the nutrient, starch, is the only nutrient that turns a distinctly purple-black color on contact with iodine. (Direction 11) Q: Was the problem, "How can we test for the nutrient, starch?" brought to a successful conclusion? A: The problem was brought to a successful conclusion. We now know that we can use dilute tincture of iodine to test for the nutrient, starch. If there is a purple-black reaction, the nutrient, starch, is present.
8. Review the guides to reading and following the directions included in this specific experiment. List guides on board, or chart them for use in reading similar experiments. (Guide 1 through 6) Have students apply the guides to following directions in another experiment.	8. Board or Chart: Guides to Following Directions in an Experiment 1. Read the whole experiment silently to form a general impression of it. 2. Read carefully to locate the problem. 3. Read to note materials needed to solve the probl 4. Read to understand the directions for solving th problem. 5. Read to understand the importance of the sequen tial order of the directions. 6. Read to understand the conclusion drawn as a so lution to the problem. Say: Use the above guides in performing the experiment o p.--- in texts. (Teacher makes this selection.)

A Final Note

The experiment in the preceding lesson proves that only one nutrient, starch, has a distinctly purple-black reaction to the testing agent, dilute tincture of iodine. It now becomes necessary to prove that the nutrient, starch, does not have a similar reaction to any other testing agent. For example, determine whether or not starch turns a purple-black color on contact with Benedict's solution, nitric acid, ammonia, etc. The guides developed in step 8, above, may be used in reading and following the directions in this experiment.

ORGANIZING AND CLASSIFYING FACTS

The inability to recall science facts quickly is a major source of difficulty encountered by many of our junior high school students. Direct instruction and practice in perceiving the relationship of science terms and ideas is indicated in order to aid students in the quick recall of much science information. Many science facts can be organized and classified according to their common characteristics. The lesson that follows describes procedures the science teacher may use to instruct students in organizing and classifying facts contained in specific science experiments. In preparation for giving this instruction, it is necessary that students have already completed testing various foods for their nutrient content. If students have previously mastered the skill of organizing and classifying science facts, then have them apply this knowledge to studying for an examination or preparing to give an oral report.

LESSON IV

Problem: Direct instruction is indicated to aid students in the quick recall of facts contained in specific science experiments.

Required Skill: Organizing and classifying facts as an aid to recall and as a time-saver.

PROCEDURE	DEVELOPMENT
1a. On completion of several science experiments connected with a specific unit of work, question to review the reasons for conducting these experiments.	1a. Science Unit: Nutrients in Food Completed Experiments: Testing for nutrients: starch, sugar, and protein. Q: Why did we conduct the above experiments? A: To help us plan balanced diets composed of foods containing all the nutrients, it is necessary that we know the nutrient content of many different kinds of foods.
b. Continue questioning to determine the cause of difficulty students encounter in remembering all the facts contained in science experiments.	b. Q: Why do some of us find it difficult to remember all the facts contained in science experiments? A: Each experiment poses a different problem, uses different materials to solve the problem, and leads to a different conclusion as a result of the problem's solution. These add up to a great number of different isolated facts to be remembered.
2. Have students participate in a timed activity, similar to that at the right, which demonstrates a method of remembering facts quickly. (Organizing and Classifying Facts)	2. Timed Experiment: Expose following chart (newsprint) for 30 seconds. Remove from view.

potatoes	pears	sugar
nuts	starch	protein
pie	eggs	meats
candy	fish	pancake
cereal	bread	cookies

PROCEDURE | **DEVELOPMENT**

2. Q: List the items you can remember. Count them.
   A: I remembered 6 items, 9 items, 5 items, etc.

   Expose the following chart for 30 seconds and then remove it from view:

   Nutrients in Foods

Starch	Sugar	Protein
bread	candy	meats
pancakes	cookies	fish
cereals	pears	eggs
potatoes	pie	nuts

   Q: List the items you remember this time. Count them. How many remembered more items this time than before? Why?
   A: We remembered many more items this time because all the items that belonged together were grouped together under one heading.

3. Through questioning, establish the reason why students are sure that the organized listing on the chart is correct.

3. Q: Are you sure that the foods on the chart are organized and classified correctly? How do you know?
   A: The experiments we conducted proved that the foods contained those nutrients. (No tests for starch were made with pie and cookies.)

4. State that the important facts included in the experiments just completed can also be organized and classified for quick recall.

4. Say: The experiments just completed on testing foods for nutrients contain many important facts which can be organized and classified for quick recall.

5. Organize the important facts contained in each experiment completed thus far by having students answer questions similar to those at the right. Write the answers in abbreviated form, in separate columns, on board or chart. (newsprint)

5. Point to chart used in activity.
   Q:a. What test did you perform to prove that these foods contain starch? Sugar? Protein?
   b. What testing agent proved the presence of starch? sugar? protein?
   c. What reaction to each testing agent was noted?
   d. What conclusion was drawn about foods having this reaction?
   A: (Write answers on board in column form.)

Column 1	Column 2	Column 3	Column 4
1. Testing foods for starch	dilute tincture of iodine	purple-black	starch present

PROCEDURE	DEVELOPMENT
	5. A: (Continued)

2. Testing foods for sugar	Benedict's Solution	green to orange to brick red on heating	green - trace of sugar; orange to brick red - rich source of sugar
3. Testing foods for protein	1. nitric acid 2. ammonia	yellow before rinsing; orange after rinsing	protein present

PROCEDURE	DEVELOPMENT
6a. Have students examine the answers listed in each column (step 5 to right) and question to find out if all the answers belong together. (organizing facts)	6a. Say: Read the answers in column one, in column two, etc., etc. Q: Do the answers in each column belong together? Why? (organizing facts) A: Yes, the answers in column one belong together because all the answers relate to testing foods for nutrients. The answers in column two all relate to testing agents. The answers in column three all relate to reactions to the testing agents. The answers in column four all relate to conclusions drawn about foods having these reactions.
b. Question to give an appropriate label or heading to each column of facts that belong together. (classifying facts)	b. Q: What label or heading can you give to each column? A: Column 1 - Testing Foods for Nutrients Column 2 - Testing Agents Column 3 - Reactions Column 4 - Conclusions
c. Write appropriate heading above each column of facts. (classification)	c. Write above classifications on chart in place of Column 1, Column 2, etc.
7. Question to check on students' understanding of the purpose and use of organizing and classifying facts in science.	7. Q: Are the important facts connected with each experiment easier to recall now? Why? A: The facts are much easier to recall now that they have been organized and classified. All the facts that belong together are listed together under appropriate headings. This aids in quick recall.

A Final Note

As additional experiments connected with the same unit are completed, have students organize and classify the factual information contained in each experiment, and add these facts to the chart developed in 6c, column 2, of preceding lesson. Give students practice in using these facts by having them participate in activities similar to the following: Select from the lunches listed below, the lunch that best represents a balanced meal, important to maintaining strong healthy bodies. Defend your choice.

Lunch I	Lunch II	Lunch III
Roast beef sandwich	Potato chips	Pizza
Stewed fruit	French fries	Pepsi-Cola
Milk	Pie	Ice cream
Cookies	Soda pop	Candy

Answer:

Lunch I best represents a balanced meal. It is composed of a variety of foods that contain the following nutrients: starch in bread and cookies, protein in roast beef and milk, sugar in fruit and cookies, fat in the cream of the milk, vitamins in milk, minerals in fruit, etc.

CONCLUSION

The lesson plans included in this section of the manual develop four of the reading skills pertinent to science learning. There are additional reading skills in which students must receive direct instruction if they are to achieve full competence in their science studies. These skills are developed in other subject areas of the manual where the science teacher will find detailed procedures for giving this instruction in these skills. (See Reading Skills Check List in the introduction.)

CHAPTER III

TEACHING READING IN MATHEMATICS

Mathematics reading is highly specialized. It requires the recognition and understanding of reading skills specifically pertinent to the subject. The initial teaching of these reading skills is the responsibility of the language arts teacher, but it is the responsibility of the mathematics teacher to refine and apply these skills as they pertain to mathematics content. If students are guided in applying the reading skills to more complex mathematics materials, then they can be more certain of success as they further advance in their schooling.

Specific reading skills necessary for successful functioning in mathematics are listed below. The starred skills indicate those for which lesson plans are included in this section. Many of the skills not starred are included within the framework of these lessons.

The ability to:

*1. Recognize and understand the different meanings of familiar words when used in mathematics context

*2. Recognize and understand mathematics vocabulary

3. Recognize and understand operational symbols, variables, etc.

4. Read and interpret tables, graphs, formulas and equations

*5. Read and understand problems

6. Distinguish between relevant and irrelevant numerical and verbal details

7. Read and follow directions correctly

Note: It is essential for teachers to recognize that many mathematics textbooks are difficult for students to read and interpret. It is necessary, therefore, that teachers know the text thoroughly and know the devices the author employed to aid students, so that teachers can instruct them in the more efficient use of the textbook. Some of these devices may be the use of bold-faced print to highlight information, the definitions included right in the context of the printed material, etc. (See Language Arts and Social Studies chapters for detailed procedures developing these skills.)

UNDERSTANDING MATHEMATICS VOCABULARY

There are basic terms in mathematics that must be thoroughly understood if students are to function efficiently in the junior high schools and in the higher schools of learning. Some of these terms, where possible, should be related to students' experiences if their meanings are to be fully developed and clearly understood. Lesson I which follows develops the understanding that familiar words often have different meanings when used in mathematics context. Lesson II develops the meaning of a specific word according to the context in which it is used. Authors often place definitions, synonyms, appositive phrases, etc. right within the context to aid students to determine the meaning of new or difficult words. For example, in the sentence, a budget is a plan for deciding how income should be spent, the meaning of the word, budget, is clearly defined by the words, a plan for deciding how income should be spent. (Definition is the contextual clue.)

LESSON I

Problem: In reading and understanding printed materials which involve banking and business practices, the meanings of specific familiar words often need clarification.

Required Skill: Developing the understanding that familiar words often have different meanings when used in mathematics context. (Multiple meanings of words.)

PROCEDURE	DEVELOPMENT
1. Write a familiar word on the board and through questioning, elicit from students different familiar meanings of the word. Write them on the board.	1. Familiar Word: principal Familiar Meanings: head of a school, chief, most important, etc.
2a. Present the familiar word in mathematics context. Write the sentence on the board.	2a. Write on board: The sum of money invested in a company or saved in a bank, not counting the interest, is called the principal.
b. Question to develop an understanding of this meaning of the familiar word. Underline the clues to the meaning included in the sentence. (definition)	b. Q: Does the word principal in this sentence have the same meaning as any listed on the board? Why not? What does it mean? How do you know? A: The word principal in this sentence has a different meaning. It means the sum of money invested or saved, not counting the interest. The definition of the word is included right in the sentence. (Underline the definition.)
3. Give students practice in interpreting the meaning of this familiar word included in problems similar to that at the right.	3. Problem: Mr. Smith invested $500 in a small business. His investment earned 6% per year. How much money did the principal earn in one year?
4. Follow procedures 1 through 3 to develop the different meanings of other familiar words when used in mathematics context.	4. Familiar words and meanings: a. capital - a letter distinguished from a lower case letter, capital city of a state or country, a form of punishment.

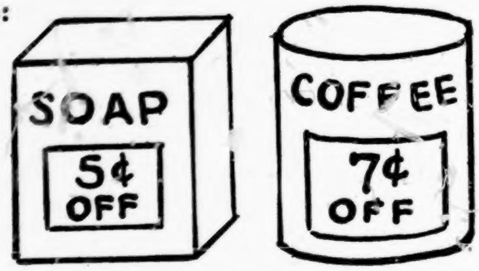
PROCEDURE	DEVELOPMENT
	4. (Continued) One mathematics meaning: Amount of money or property used in carrying on a business. b. volume- a book; in music a fullness of tone; etc. One mathematics meaning: Number of cubes contained in a solid.
5. List on a chart (newsprint) the familiar words and their mathematics meanings developed in this lesson. Add to the chart as other mathematics vocabulary is developed and display chart in a prominent place in the room.	5. Chart: Mathematics Vocabulary principal-sum of money invested or saved, not including interest. capital -amount of money or property used in carrying on a business. volume -number of cubes contained in a solid.
6. Review the purpose and use of the reading skill developed in this lesson. Apply this skill to determine the mathematics meaning of additional words.	6. Skill: Familiar words often have different meanings when used in mathematics context. a. It is important to read carefully to determine the meaning of familiar words. b. The context often includes guides to the meaning of familiar words as they are used in mathematics. Additional words: base, scale, gross, etc.

Lesson II

Problem: Problems involving business practices contain specific mathematics vocabulary. This vocabulary needs clarification in order to become meaningful to students.

Required Skill: Understanding specific vocabulary according to the mathematics context in which it is used.

PROCEDURE	DEVELOPMENT
1a. Describe a familiar experiential situation similar to that at the right.	1a. Experience: Influenced by the following newspaper ads, the teacher purchased a new television set: Ads: Masters, S. Klein, Korvette, etc., all advertised big discounts on television sets.
b. Question to determine the mathematics meaning of a specific word as it was used in the experiential situation in (a)	b. Q: How did the ads influence the teacher in buying a television set?

PROCEDURE	DEVELOPMENT
	1b. A: The ads showed the teacher that she could save money by purchasing a set in one of the stores that advertised. Q: Which words gave the teacher this understanding? A: The words big discounts. Q: What does the word discount mean in these ads? A: discount - amount of money deducted from an original price.
c. Write the specific word and its meaning on the board.	c. Write on the board: discount - money deducted from an original price.
2. Question to elicit similar familiar experiences that involve students' understanding of this meaning of the specific mathematics word.	2. Q: Do you ever find merchandise sold at a discount in the supermarkets? Give examples. A: Yes. Examples:  Q: Does the word discount appear on these products? A: No. Q: Then how do you know the products are being sold at a discount? A: The products say 5¢ off and 7¢ off which indicate that each product is selling for an amount off the regular price. (discount)
3. Review the clues that guided students in determining the meaning of the word. Pictures Words Symbols	3. Clues to the meaning of discount: Pictures of television sets in newspaper ads. Printed words in ads: big discounts on television sets. Symbols and words on labels: 5¢ off, 7¢ off.
4. Have the meaning of the word verified in the teacher's dictionary.	4. First meaning of word discount found in dictionary: a deduction from an original price.
5a. Direct students to read a problem similar to that at the right, drawing their attention to the same mathematics word used in the problem.	5a. Say: Read the following problem very carefully: Problem: A storekeeper borrowed $500 from a bank for a period of three months. A discount amounting to 6% of the loan was deducted in advance by the bank. How much money did the storekeeper receive from the bank?

PROCEDURE	DEVELOPMENT
5b. Question to elicit the meaning of the same mathematics word as it is used in this problem.	b. Q: What is the meaning of the word discount in this problem? A: It means that money was deducted from the original amount requested from the bank. The bank deducted an allowance for interest on the money it was lending. Q: Why didn't the storekeeper receive the original amount of the loan requested from the bank? A: He had to pay the bank interest charges in advance for lending him the money. These charges were deducted from the original amount requested. Say: Although there seems to be a difference in this meaning of the word discount, it has the same meaning as in step 1a. because money was deducted from an original amount. The storekeeper did not receive the original amount he requested.
6. Review the word clues that guided students in determining the meaning of the mathematics term, and question to locate the clues.	6. Word clues to the meaning of the word discount: borrowed money, bank, discount, deducted in advance. Q: Where did you find the clues to the meaning of the word, discount? A: The word clues were contained right in the problem itself.
7. Refer to the meaning of the mathematics term written on the blackboard, and question to establish the similarity of the meaning in both the experiential situation, step 1a, and the problem, step 5a.	7. Q: Why is the meaning of the word, discount, alike in both problems? A: The meanings of the word, discount, are alike because each refers to a deduction of money from an original amount.
8. Using problems similar to those at the right, have students use the various clues described in steps 3 and 6 to determine the meaning of the mathematics term.	8. Problems: 1. Mr. Jones borrowed $800 for one year to pay for his son's tuition. The loan company deducted in advance a discount of $48.00. What discount rate did the company charge? (discount-in borrowing money, an amount deducted from the amount requested.) 2. A man purchased a used car listed at $1,000. The company gave him a 10% discount for cash. How much did the man pay for the car? (discount - an amount deducted from the regular price.)

A Final Note

Although the two preceding lessons are geared to a specific grade in the junior high school, the procedures outlined in each lesson may be used on any grade level. The teacher simply substitutes her own examples for those given in column 2 of the lesson. For example, in lesson 1, the meaning of the term, obtuse, may be developed from its familiar concept, that of being dull, stupid, etc., to its different meaning when used in mathematics context, that of being an angle larger than a right angle, having more than 90, but less than 180 degrees.

It is suggested that the teacher use the steps outlined in the preceding lesson to develop an understanding of vocabulary pertinent to specific mathematics areas before giving formal mathematics instruction in these areas. Vocabulary difficulties contained in mathematics problems often block full understanding of the problems if the meanings of the words are not fully understood. The word meanings must be unlocked before the solution of a problem is attempted.

UNDERSTANDING A COMPREHENSION AND WORK-STUDY SKILL

Problem solving causes a great deal of difficulty in mathematics because students do not know how to read and interpret problems. Instruction is needed in the ability to recognize that mathematics problems are read differently from many other types of reading material. Students must be instructed in the steps which act as guides to interpreting a problem so that the problem may be brought to its correct solution. The lesson that follows describes procedures the teacher may use to develop the guides so important to reading and interpreting problems in mathematics.

Before attempting this lesson, the teacher should clarify mathematics vocabulary contained in the problem, such as budget, per cent, etc. Students should understand the categories which comprise a budget. They must also understand the fundamental processes necessary to find what per cent one number is of another.

LESSON III

Problem: Although skilled in the fundamental arithmetical processes, students invariably solve problems incorrectly because they do not know how to read and interpret them.

Required Skill: Developing an understanding of the guides to reading and interpreting mathematics problems.

PROCEDURE

1. Present a problem on the board or in a text. Have students read the entire problem silently to form a mental picture of the problem as a whole and to find any difficult words contained in the problem. (Guide 1)

2. Question to determine the mental picture formed when reading the problem and to clarify the difficult vocabulary.

DEVELOPMENT

1. Problem:

Jim earns $10.00 a week working part-time. His mother suggested that he budget or plan how to spend his earnings for this one week. He decided to spend his earnings as follows:

Gifts and Savings	$ 2.40
Refreshments	1.85
Movies	.85
Haircut	1.65
Shoes mended	2.35
School supplies	.90
Total	$10.00

What per cent of his earnings did he plan to spend for a) gifts and savings, b) refreshments, c) movies, d) haircut, e) shoes mended, f) school supplies?

2. Q: Describe the mental image or picture that formed in your mind as you read the problem silently.

A: A boy discussing with his mother a budget or plan for spending his weekly earnings

Q: What does the word budget mean?

A: A budget is a plan for spending earnings. (Synonym for budget included right in the problem-contextual clue to word meaning.)

PROCEDURE

3. Have problem read orally to make certain that students recognize and understand all words. Then direct students to re-read the problem to sustain the thought and to determine:
   a. The facts given in the problem.
   b. The question asked in the problem. (Guide II)

   Through questioning, elicit from students the facts given and the question asked in the problem.

4. Have students examine the facts given and the question asked in the problem. Question to determine the relationship that exists between the facts given and the question asked. (Guide III)

5. Question to decide on the arithmetical processes needed to solve the problem. (Guide IV)

6. Indicate the fact that estimating the answer to a problem before actually solving it, is an aid in checking actual answers. (Guide V)

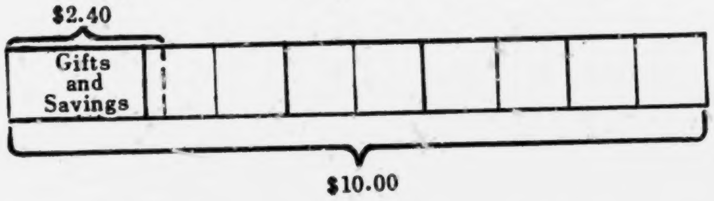
DEVELOPMENT

3. Call on student to read the problem orally to class. Then have the problem re-read silently to answer the following question:

a. Q: What facts are given to you in this problem?
   A: Jim's weekly earnings: $10.00. Jim's budget for this one week: Gifts and Savings, $2.40; refreshments, $1.85; movies, $.85; haircut, $1.65; shoes mended, $2.35; school supplies, $.90. Total $10.00.

b. Q: What are you asked to find in the problem?
   A: What per cent of his earnings Jim plans to spend for each of the items in his budget.

4. Say: Examine the facts given and the question asked in the problem. Keep in mind that Jim plans to spend part of his total earnings ($10.00) for each item in his budget, and we must find out what per cent of the total earnings he plans to spend on each item. In order to see the relationship between what is given and what is asked, here is a picture showing the total $10.00 and the amount spent for gifts and savings.



Q: What part of the $10.00 does the $2.40 seem to be?

A: The $2.40 appears to be about 2 out of 10 or 2/10, or 20% of the total. (Teacher continues in the same manner.)

5. Q: How can we find $2.40 out of $10.00 exactly?

A: $\frac{2.40}{10}$ or $1000\overline{)\,240.00}$

Example:

```
  2x40.       .24 = 24%
10x00.) 2x40.00
        2 00 0
          4000
          4000
```

6. Say: It is much easier to work with numbers like hundreds, rather than with the individual amounts planned for each item. Therefore we shall round off each amount spent to the nearest hundred; in this case, to the nearest dollar. For example, we can

PROCEDURE

DEVELOPMENT

6. Say: (Continued)
   round off the amount $2.40 to $2.00 because $2.40 is closer to $2.00 than it is to $3.00.

   Say: Round off the $.85 for movies to the nearest dollar and the answer is $1.00. The $1.00 is 1/10th of Jim's total earnings or 10% of his earnings. (Continue to estimate the answers.)

   Q: What is the sum of your estimates?

   A: 10/10ths is the sum of my estimates.

   Say: Then Jim has budgeted his total earnings for one week because 10/10ths equals the total amount of his earnings.

   Say: When we have solved the problem later, we will find out how close our estimated answers have come to our actual answers.

7. Have students solve the problem and question to check the estimated answers against the correct answers. (Guides VI and VII)

7. Say: Now solve the problem. (Give time for solution.)

Actual Answers		Estimated Ans.
Gifts and savings	24 %	20%
Refreshments	18½%	20%
Movies	8½%	10%
Haircut	16½%	20%
Shoes mended	23½%	20%
School supplies	9 %	10%
Total	100.0%	100%

   Q: How does each estimated answer compare with the actual answer?

   A: Each answer is close enough to the actual answer for us to conclude that our actual answers are reasonable ones.

8. Review, and list on board or chart, the guides used in reading and interpreting a problem. (Guides I through VII in Col. 1)

8. Chart:

   Reading and Understanding Mathematics Problems

   I. Read the whole problem silently to:
      A. form a mental picture.
      B. clear the difficult vocabulary.
   II. Re-read the whole problem to:
      A. note facts given.
      B. note questions asked.
   III. Determine the relationship between the facts given and the questions asked.
   IV. Decide on the process or processes needed to solve the problem.
   V. Estimate the answer.
   VI. Solve the problem.
   VII. Check the answer against the estimated answer.

9. Give students practice in reading and interpreting other problems.

9. Problem:
   Mr. Smith's weekly take-home pay is $150.

PROCEDURE

9. (Continued)

DEVELOPMENT

9. Problem: (Continued)

He and his wife decided to prepare a budget to keep their expenses within his earnings. List the possible expenses that a family of four persons must consider in preparing a budget. Decide on a reasonable amount to be allocated for each expense. What per cent of his earnings did you plan to spend for each expense listed?

A Final Note

Separate lessons may be indicated in order to develop the guides used in reading and interpreting mathematics problems. (Step 8 in the preceding lesson.) It is suggested that guides I through IV be developed in one lesson, and guides V through VII in a second lesson. Students may need practice in using the guides developed in each lesson in order to read and interpret a variety of problems. It is also advisable to place the guides on a chart to which students may constantly refer until the use of the guides becomes more or less automatic.

CONCLUSION

There are additional reading skills which specifically apply to the field of mathematics. Very often a problem is weighed down with numerical and verbal details not necessary to the solution of the problem. It becomes pertinent, therefore, to instruct students in the ability to determine the details which are relevant to the solution of the problem and to eliminate the details irrelevant to its solution. For example:

> Mrs. Rowe, Mary, and Jim will travel by train from New York to Chicago. They will return in 10 days. One round trip coach fare costs $71.78. Jim is under 12 and pays half fare. Mary is under 5 and travels free. How much will the whole trip cost Mrs. Rowe?

Of what importance to the solution of the problem is the fact that Mrs. Rowe, Jim, and Mary will return in 10 days? The fact that they will return is relevant to the solution of the problem, but the numerical detail, 10 days, is completely irrelevant and therefore can be eliminated.

The ability to read and follow directions correctly is also important to mathematics. See Lesson II in Science. and Lesson II in Industrial Arts, for detailed plans on developing the ability to read and follow directions. Substitute mathematics examples and follow the procedures outlined in column one to develop the skill.

Understanding parts of a book and the purpose and use of an author's organizational devices are also important skills in the field of mathematics. See Lesson III in the chapter on Language Arts for a lesson on parts of a book, and Lesson I in the work-study skills in Social Studies for understanding the purpose and use of an author's organizational devices. (Printing clues) This lesson may be adapted for use in mathematics by selecting those steps which apply to a mathematics text.

CHAPTER IV

TEACHING READING IN INDUSTRIAL ARTS

It is the responsibility of the teachers of Industrial Arts to instruct students not only in the manipulative processes of their subjects, but also in the reading skills pertinent to their specific areas.

Each area has its own special vocabulary. Each area has graphic materials which must be read and interpreted. Each area has projects which involve the ability to follow written directions. Consequently, it is essential that students receive direct instruction in those reading skills which are basic to successful achievement in the shop areas.

The lesson plans contained in this section give methods of procedure and specific examples to develop the following reading abilities:

1. The ability to recognize and understand special shop vocabulary.
2. The ability to understand that familiar words often have different meanings according to the context in which they are used.
3. The ability to read and interpret graphic materials.
4. The ability to follow printed directions.

Each plan is geared for a woodworking shop. However, it is important to note that the procedures listed in Column I of each lesson are basic procedures and may be applied to any shop. The teacher may use these plans by substituting specific examples from his own area for those listed in Column II of each lesson. These lessons are geared for seventh grade classes. If they are used with eighth or ninth grade classes, appropriate examples must be substituted.

To meet the needs and ability levels of all students, the teacher may downgrade or upgrade the lessons by substituting simpler or more difficult examples for those listed in Column II of each lesson.

RECOGNIZING AND UNDERSTANDING SHOP VOCABULARY

The Industrial Arts in the junior high school offers a self-motivating environment for students to learn and refine basic vocabulary. Each shop has its own tools, its own materials, and its own processes. Students must be given instruction in recognizing and understanding the terminology associated with these specific shop areas. Lesson I and II that follow develop specific vocabulary pertinent to a woodworking shop. If students are already familiar with the examples used in both lessons, the teacher merely substitutes different words and proceeds to develop the skills.

LESSON I

Problem: Students indicate a need for understanding special vocabulary in a woodworking shop.

Required Skill: Recognizing and understanding the meaning of vocabulary.

PROCEDURE	DEVELOPMENT
1. Present a completed project to the class, the same as, or similar to the one on the right, and tell students that this is the project they have selected to make.	1. Present a bookrack to students. Say: For your next project, you have chosen to construct this bookrack.
2. Tell students that specific tools are needed to make the project. Display the tools needed to carry out the project. Have a name card for each tool and pronounce the name of the tool. Fix the visual association of the actual tool with the oral and printed word on the card.	2. Say: To make this, you will have to use several tools. We will discuss these tools in preparation for their use. Tools needed for project: chisel, file, rasp, plane, try square. (Attach name cards to tools.) Say: Study the name card attached to each tool. (Set time limit.)
3. Collect name cards and have students match each name card with its proper tool.	3. Say: Now I'm going to gather all the name cards. See if you can match each name card with its tool as I hold up the card. Place this name card next to the tool it represents. Example: file - (tool) file rasp - (tool) rasp, etc.
4. Display one tool and through questioning, elicit from students the description and function of this tool, in order to arrive at its definition. Record definition on board or chart. Call on individual students to read the definition orally.	4. Q: How would you describe this tool? What is its use? A: A chisel is a tool with a steel cutting edge at the end of a strong blade. It is used to cut or shape wood. (Write the definition on board or chart.)
5. Continue as in 4 above to develop the description and function of each tool needed for this project.	5a. A file is a steel tool with many small ridges on it, used to smooth wood. b. A rasp is a very coarse file with sharp points that form a grating surface, used to rub against wood.

PROCEDURE	DEVELOPMENT
	5c. A plane is a tool with a blade, used for smoothing or leveling the surface of wood. d. A try square is a tool for drawing right angles, and for testing the squareness of anything.
6. Reinforce the names of the tools and their functions.	6. Erase the names of the tools from their definitions on the board. Display the name card for rasp. Say: Match this name card to its proper definition. Example: A ______ is a very coarse file with sharp points that form a grating surface used to rub against wood. (Affix word card to definition). Repeat above for chisel, file, plane, try square.
7. Through questioning, review the specific words and their meanings developed in this lessons. Apply the learnings by directing students to chart the vocabulary.	7a. Q: What tools connected with making a bookshelf did you learn to recognize today? A: chisel, rasp, etc. b. Q: What do these words mean? A: See definitions in steps 4 and 5 above. Chart: Tool Description Use

LESSON II

Problem: There is a need for understanding the multiple meanings of familiar words used in a woodworking shop.

Required Skill: Understanding that familiar words often have different meanings according to the context in which they are used.

PROCEDURE	DEVELOPMENT
1. On board or chart, present a word which is familiar to students. Use a word the same as, or similar to, the one on the right.	1. Familiar word: stock
2. Call on individual students to use the familiar word in a sentence to illustrate what the word means to them. Through questioning, determine the exact meaning of the word as it is used in each sentence. Lead students to see that the context of each sentence gave the clue to the exact meaning.	2. Say: Use the familiar word stock in sentences and explain its meaning as it is used in each sentence. 1st sentence: The sum of money, or capital that is invested in a business, is called stock. (Financial meaning of stock - sum of money or capital invested - definition.) 2nd sentence: Our ancestors came from a pioneer stock that took danger as part of every day living. (Social studies meaning of stock - race, family, lineage.)

PROCEDURE	DEVELOPMENT
	2. 3rd sentence: The adventure story told of rustlers who stole the stock of cattle from the ranch. (Meaning in a story - stock - the whole supply.)
3. Present the familiar word in shop context and elicit its meaning as used in this sentence. Tell students that familiar words often have different meanings when used in shop context.	3. Say: You can see that this familiar word stock has many different meanings. Read the following sentence to determine the meaning of stock as it is used in this context. Sentence: The boy was told to cut a piece of pine stock 13" x 25" for the top part of the shelf. Q: What is the meaning of stock in this sentence? A: Woodworking shop meaning-stock-wood. Q: What determined the different meaning of the word stock in this sentence? A: The other words in the sentence helped to determine the meaning of the familiar word, stock. (Examples: cut, pine, shelf, etc.)
4. Following the procedures listed in steps 1 through 3, present other familiar words which have different meanings when used in shop context.	4. Additional familiar words:

Word	Familiar Meaning	Shop Meaning
grain	wheat, rye, etc.	arrangement or direction of fibers in wood.
lap	the front part of the lower trunk and thighs of a seated person	to apply finishes to wood, one application partly over another
coat	an outer garment	a layer covering a surface
butt	to push or hit with the head	to join end to end

PROCEDURE	DEVELOPMENT
5. Through questioning, review the purpose of the lesson and review the shop meanings of the familiar words developed in this lesson. Apply the learnings by having students enter the chart in their notebooks.	5. Q: What did we learn today? A: We learned the different meanings of several familiar words when they are used in shop context. Q: What do the words stock, grain, lap, coat, and butt mean? (Use meanings listed in 3 and 4 above.) Q: How did we arrive at the specific meanings of these familiar words? A: We used the other words in the sentence to determine the shop meaning of the familiar words.(Context Clues) Say: Copy the chart into your notebooks. (Step 4 above)

A Final Note

As indicated in the introduction to this chapter, the procedures in these lessons may be used by a teacher of any Industrial Arts subject. For example, in Lesson I, the teacher of a general metal shop may substitute the words vise, hacksaw, etc., and then proceed to develop the lesson. In Lesson II, the teacher of a print shop may substitute the familiar words type, case, press, etc., and proceed to develop the meaning of these words when used in this shop area.

READING AND INTERPRETING GRAPHIC MATERIALS AND PRINTED DIRECTIONS

It must not be taken for granted that every junior high school student has the ability to read and interpret graphic materials and to follow directions. Students need instruction and guidance in reading and interpreting graphic materials. They need instruction and guidance in reading and understanding the "when to do," the "what to do," and the "how to do" of a given set of directions. They need to be taught that directions must be followed sequentially and accurately so that the desired goal can be achieved. Students' increased ability to follow directions will more than compensate for the additional time taken for the direct instruction of this basic reading skill.

In order that students are not confronted with terminology which may affect their understanding of graphic materials or printed directions, they must receive instruction in the special vocabulary that appears in such lessons. For example, in Lesson II, the meaning of the word, finish, as used in the directions, should be developed according to the general procedures described in Lesson II on Vocabulary Development.

In Lesson II, before students receive instruction on following directions, their projects must be ready for the final finishing process. For example, students should have used a filler, (if needed), either putty or plastic wood, in preparation for applying the shellac.

LESSON I

Problem: Students have difficulty in understanding diagrams in a woodworking shop.

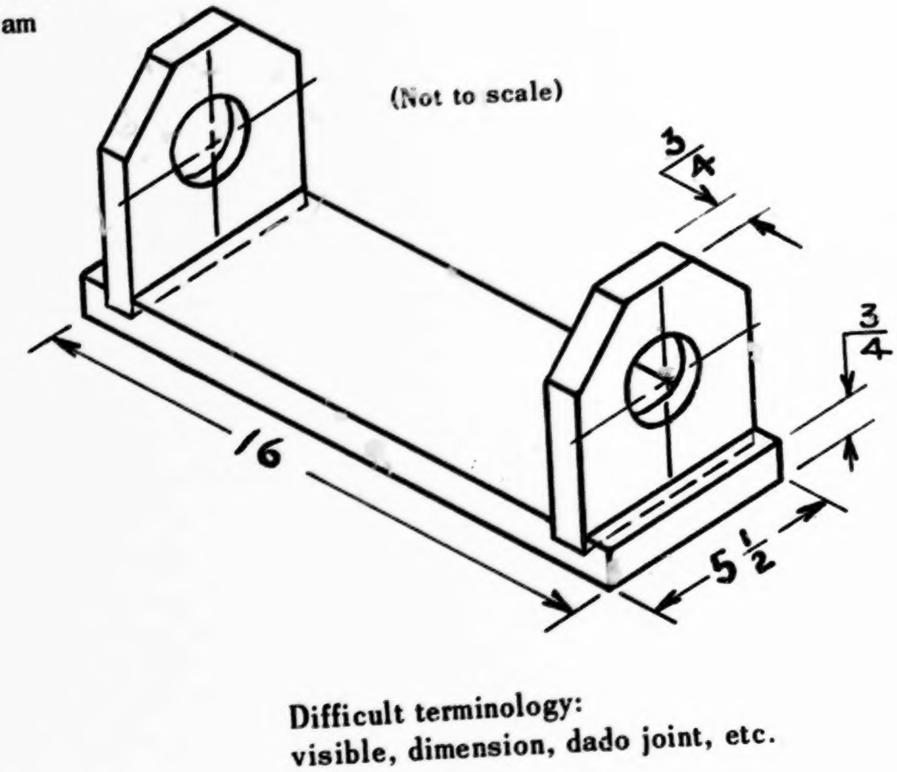
Required Skill: Reading and interpreting diagrams.

PROCEDURE

1. Distribute sheets which contain a diagram, the same as or similar to the one on the right. Difficult terminology connected with the diagram must be clarified in advance.

DEVELOPMENT

1. Diagram: Bookrack


(Not to scale)

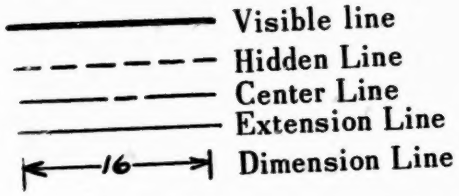
Difficult terminology:
visible, dimension, dado joint, etc.

PROCEDURE	DEVELOPMENT
2. Question students to determine what this diagram represents to them. (Step a)	2. Q: What does this diagram represent? A: This is a diagram of a bookrack. Q: How do you know? A: The name, or title of the diagram tells us this, and the diagram looks like an outline of a bookrack. Say: Then the title of the diagram is important because it tells us what the diagram represents.
3. Have students examine the diagram and elicit from them the meaning of the parts that are familiar to them. (Step b)	3. Say: Look at the diagram. Q: How long is the bookrack? A: The bookrack is 16" long. Q: How do you know? A: This is indicated on the diagram. Example: ⊢←—— 16 ——→⊣ Q: How wide is the bookrack? A: The bookrack is 5½" wide. Q: How do you know? A: This is indicated on the diagram. Example: ⊢←—— 5½ ——→⊣ Q: Find the measurement 3/4" on the diagram. What does it mean? A: It means that the board is 3/4" thick. Q: What else on the diagram shows you that this is a bookrack? A: The heavy black lines show us that this is a bookrack. (outline) Say: Then this diagram contains information which is definitely familiar to you.
4. Direct students to re-examine the diagram and elicit the fact that various kinds of lines are used which they do not understand. As each type of line is identified, draw it on the board. (Step c)	4. Say: Look at the diagram again. Q: Do all the lines look the same? A: No. Q: How are they different? A: Some are light, some are broken, etc. (Kinds of lines on the diagram: ━━━━, ———, – – – – – –, etc.)
5. State that each type of line on a diagram has a specific meaning.	5. Say: Each type of line on a diagram has a specific meaning which must be understood if the diagram is to be read and interpreted correctly.
6. Present a chart which explains the meanings of the unfamiliar lines on the diagram. (Step d)	6. Say: Look at this chart.

PROCEDURE

DEVELOPMENT

ALPHABET OF LINES



Say: This is a chart of some of the lines used in woodworking diagrams. It is called an Alphabet of Lines. It lists some lines and indicates what they represent.

7.a. Direct students to re-examine the familiar lines on the diagram and elicit from them a description of these familiar lines.

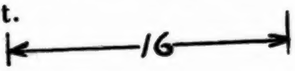
7.a. Say: We know from the diagram that the length of the bookrack is 16". Point to 16" on the diagram. Examine the line on either side of the number 16.

Q: How would you describe this line?

A: This is a solid line, on either side of the 16, lightly drawn, with an arrowhead at each end. (Continue in like manner with remaining lines.)

b. Have students locate the familiar lines on the chart, and have them describe these parts and tell what they represent.. (Step e)

b. Say: Find this line on the chart.

Q: What is this line called? 

A: It is called a dimension line.

Q: Why?

A: Because it gives us the limits of length, breadth or thickness.

Q: Where is the measurement 16" placed?

A: In the center of the line. This is really a solid line broken in the center to insert the measurement 16.

Q: Who can give us a complete definition of a dimension line?

A: A dimension line is a solid line, broken in the center for the insertion of the mesaurement figures. The line has an arrowhead at each end. The dimension line is used to indicate the limits of length, breadth or thickness.

Say: Look at the chart again.

Q: Were we correct when we said the heavy black lines showed us that this was a bookrack? What does the chart say about a heavy black line?

A: Yes. The chart shows that a heavy line indicates the outline of the object.

PROCEDURE	DEVELOPMENT
8.a. Direct students to examine one unfamiliar line on the diagram and have them locate this line on the chart.	8.a. Say: Look at the short dash lines on the diagram. Q: Can you find a short dash line on the chart? What is it called? A: This kind of line is called a hidden line.
b. Develop the meaning of this unfamiliar line as indicated on the chart and apply this meaning to the diagram. (Step f)	b. Q: Why is it called a hidden line? A: It is called a hidden line because it represents part of the bookrack that cannot be seen. Say: Look at the diagram again and examine the dash lines. (Point to specific dash lines) Q: To what do these specific short dash lines refer? A: These short dash lines refer to the bottom of the piece of wood inserted into the dado joint. Q: Can you see the bottom of the piece of wood inserted into the dado joint? Why not? A: No. The bottom of the piece of wood cannot be seen because it is hidden from the eye.
9. Have students examine additional parts of the chart which appear on the diagram. Clarify the meaning of these lines.	9. Say: Examine the chart. Find other lines which apply to reading and understanding this specific diagram. Example: ——— – ——— Center Line ————— Extension Line Q: How can we define each line? A: Center lines are alternate long and short dashes used to locate centers. Extension lines are fine, long dash lines extending from, but not touching, the outline of the figure to indicate the limits of the dimension line.
10. Review Steps a through f, indicated to the right, on reading and interpreting a diagram in a woodworking shop. Have students copy these steps into their notebooks.	10. Q: What steps must we follow in order to read and interpret diagrams correctly? A: Steps: a) Read the title. b) Examine the diagram for familiar parts. c) Re-examine the diagram for unfamiliar parts. d) Locate the explanation of the unfamiliar parts. e) Read the explanation of these parts. f) Apply these explanations to the diagram itself. (Students copy steps into notebooks for future use.)

A Final Note

The steps described in the preceding lesson are basic to developing the ability to read a diagram in any area. Because these steps are so important in understanding all diagrams, it is suggested that the steps listed in Number 10, Column II, be placed on a chart for future reference.

LESSON II

Problem: Students indicate a need for instruction in reading and following printed directions in a woodworking shop.

Required Skill: Understanding how to interpret and follow printed directions.

PROCEDURE	DEVELOPMENT
1. Using two finished projects, the same as, or similar to those on the right, have students select the project which looks better to them. Elicit from students the reasons for their choice. Through questioning, create an awareness for the need to understand how to follow printed directions. State that there are guides to aid students in understanding and following printed directions.	1. Display two bookracks - one which has been finished properly, and one which has been spoiled in the finishing process. Q: Which bookrack looks better to you? A: The one with the smooth, even finish looks better. (Point to it.) Q: Why didn't you select the other bookrack? A: The other rack doesn't have a smooth even finish. Q: Why do you think it doesn't have a smooth even finish? A: The boy didn't know how to finish a bookrack. Q: He had a set of directions which told him how to finish the bookrack. What must have happened? A: He didn't read the directions carefully. He didn't follow them properly. Say: We shall avoid this error. We shall learn some guides to help us follow printed directions in preparation for putting a finish on a bookrack.
2. Distribute job sheets which contain a set of printed directions, the same as, or similar to that at the right.	2. Job Sheet: How to Finish a Bookrack. a. Dip the brush into the shellac almost the full length of the bristles, and remove excess shellac by drawing the brush over the edge of the container. b. Apply the shellac once, brushing with the grain, along the entire length of the wood, thus avoiding laps. c. Allow at least six hours to dry in a dust-free area.

PROCEDURE	DEVELOPMENT
	2. d. Rub wood smooth with steel wool or sandpaper, rubbing with the grain and using a light even stroke. e. Repeat steps a through d for each additional coat of shellac, if applied. f. Rub final coat of shellac with finishing paper and rubbing oil, or with steel wool packed with wax.
3. Direct students to read the entire set of directions silently to get a general impression of the directions. Question students about their impression of the directions as a whole. (Guide one)	3. Say: Read all the directions silently. Read them very carefully to get a general idea or a mental picture of what you are supposed to do. (Allow a few minutes for silent reading.) Q: Do you have a picture in your mind of what you have to do in order to finish your project? A: Yes, we now know that there are definite steps to follow very carefully in order to put a proper finish on our project.
4. Direct students to reread the entire set of directions to note the sequential order of the steps. Through questioning, determine from students the importance of, and the need for, following the steps in this order. (Guide two.)	4. Say: Read the directions again to note the order of the steps we have to follow. (Allow a few minutes for rereading.) Q: What is the first step? A: Dip the brush into the shellac almost the full length of the bristles and remove excess shellac by drawing the brush over the edge of the container. Q: What is the next step? A: Apply shellac once, brushing with the grain along the entire length of the wood, thus avoiding laps. Q: Why is it necessary to do step one before step two? A: We couldn't do step two before step one because there would be no shellac on the brush. (Repeat the techniques used above until all the steps have been covered in sequence.)
5. Call on individual students to read each direction aloud. Pinpoint for students the important, or key words, in each step. Have students underline the key words in each step on their job sheets. (Guide three.)	5. Say: It is not necessary to remember every word in a set of directions. Underline the most important words in each step to help you remember both the steps, and the order in which they must be followed. Read the first directions aloud.

PROCEDURE	DEVELOPMENT
	5. Example: Dip the brush into the shellac almost the full length of the bristles, and remove excess shellac by drawing the brush over the edge of container. Say: Underline the following words on your job sheet: dip, brush, shellac, almost, full, length, bristles, remove, excess. Say: Now read only the underlined words above. Q: What have we done with this direction? A: We have selected important words in the direction to pinpoint the important details that tell us what to do, how to do it, and when to do it. (Repeat techniques above to select the key words in steps b through f of the directions.)
6. Through questioning, review the purpose of the lesson and review guides one, two, and three for following printed directions. Have students apply these guides to another set of directions.	6. Q: What guides did we learn today that will help us to follow printed directions? A: a. Read the directions silently and carefully to get the general idea of the directions as a whole. b. Review the directions to determine the importance of the order in which the directions are to be followed. c. Select the most important or key words in each step that tell us exactly what to do, how to do it, and when to do it. (Select another set of directions for students to read and interpret.)

A Final Note

The guides to reading and following printed directions developed in this lesson, (step 6), may be used to read and follow any given set of directions. It is suggested that the teacher place these guides on a chart in order that students may refer to them frequently.

CONCLUSION

There are additional reading skills pertinent to the Industrial Arts area. Separate lessons are necessary for teaching these reading skills. For example, to insure students' understanding of the main idea of a paragraph and the details that relate to the main idea, the teacher should guide students in the reading instruction that develops these skills. (See Lessons I, II, III on Understanding Paragraphs in the Social Studies Chapter for procedures to follow in developing these skills.) It may also be necessary that students receive instruction in organizing and classifying words and phrases as a time saver, and as an aid to recalling information. (See lesson on Organizing and Classifying in the Science Chapter for procedures to follow in developing this skill.) To use these lessons, the teacher just substitutes industrial arts examples to develop the procedures outlined in Column I of each lesson.

CHAPTER V

TEACHING READING IN THE LANGUAGE ARTS

Students in junior high school vary greatly in reading achievement. The majority of students are normal readers, reading on grade level. Some are accelerated readers, reading beyond their grade. Others are inefficient readers, reading below the seventh year. To meet the needs of all students, it is necessary, therefore, to continue formal reading instruction during the junior high school years. The responsibility for this instruction rests primarily on the language arts teacher.

Two curriculum bulletins, issued by the Board of Education of the City of New York, adequately provide the language arts teacher with the scope and sequence of the major reading abilities and skills needed to meet the needs of the majority of students in the junior high school:

1. "English-Language Arts: Grades 7-8-9" (1955-56 Series, Number 11) lists the major reading abilities, with the sequence of skills shown within each major ability. The grade placement for teaching each reading skill is indicated in the column to the right of the skill. The first column indicates a reading ability below the seventh year and is generally intended for the inefficient reader in the junior high school. The last column is intended for students reading beyond the junior high school level. These students need advanced reading instruction in order to achieve their greater potential.
2. "Reading: Grades 7-8-9" (1957-58 Series, Number 11) pp. 23-53 includes a detailed listing of the major reading abilities and skills, and in addition, on pp. 79-112 offers specific methods which the language arts teacher may use to give reading instruction to the majority of students in the junior high school.

"Reading: Grades 7-8-9"' however, does not offer methods for the development of specific reading skills which experience has shown are in need of development in the junior high school. Therefore, the following lessons suggest method of procedure which the language arts teacher may use to develop those skills which are basic to efficient reading:

Using guide words in the dictionary
Using the dictionary as a pronouncer
Using various parts of a book
Using an index efficiently

The problem approach is used in these lessons which are designed to take only part of a period. If the problem arises in the classroom, then the students need this instruction. If the problem does not exist, then it follows that this instruction is not indicated.

USING THE DICTIONARY

Understanding the function of the dictionary involves a series of skills essential to its efficient use. Students must be taught to understand that the dictionary provides information about words - their meanings and their various uses. They must be taught to understand how to find a word expeditiously and how to choose the desired meaning from those listed in the dictionary. They must be taught how to use the dictionary as a pronouncer and as a speller. Systematic instruction in the use of the dictionary is necessary if students are to acquire these understandings. The lessons that follow suggest methods of procedure which the language arts teacher may use to develop specific skills pertinent to the use of the dictionary. As indicated in the introduction to these lessons, if the problem does not arise, this instruction need not be given.

If students show the need for more elementary instruction in the use of the dictionary, the teacher may refer to the appendix for a lesson on word-placement and alphabetizing.

LESSON I

Problem: There is an obvious need for instruction in understanding the purpose and use of guide words as an aid to locating words in the dictionary.

Required Skill: Developing the efficient use of guide words in locating specific words in the dictionary.

PROCEDURE	DEVELOPMENT
1a. Write a word on the board, the same as or similar to that at the right, and direct the students to locate this word in the dictionary as quickly as possible.	1a. Write the word, lithograph, on the board. Say: Locate this word in the dictionary as quickly as possible.
b. Observe students while they are locating the specific word. Tell them the results of your observation and explain that the dictionary offers additional guides to aid in locating words more quickly.	b. (Observe students as they locate the word, lithograph, in the dictionary.) Say: I noticed that you turned immediately to the second section of the dictionary which contains words beginning with letters h to m. That was excellent. Then I noticed that many of you ran your finger down the columns of words on page after page until you located the word. Say: The dictionary offers us guides to help us in locating words much more quickly.
2. Have students turn to a specific page in the dictionary, and draw their attention to the following points of information: There are two columns of words listed on the page. (entry words) There are two words located at the top of the page, one over each column. (guide words)	2. Say: Turn to page....in the dictionary. Notice that there are two columns of words listed on this page. The words in these columns are known as entry words because they are entered in the dictionary for explanation and meaning. Notice also the two words located at the top of the page, one over each column. These words are

PROCEDURE	DEVELOPMENT
2. (Continued) Explain the meanings of entry words and guide words.	2. Say: (Continued) called guide words because they act as guides to the entry words on the page.
3. Through questioning, elicit from students the difference between the type of print used for the entry words and that used for the guide words. Have students suggest reasons for the difference in the type of print.	3. Q: Do you notice anything about the type of print used to indicate the entry words? A: The words are printed in a heavy, black, bold-faced print. Q: Why do you think this type of print was used? A: This print makes the words stand out more clearly. Q: Do you see any other words on the page printed in a black, bold-faced type, larger than that used for the entry words? A: The guide words, liquid air and litre, located at the top of the page, are printed in a larger type. Q: Why do you think this larger, bold-faced type of print is used for the guide words? A: We know the guide words stand out very clearly but we don't know the reason for this.
4. Through questioning similar to that at the right, have students determine whether or not the guide words are listed elsewhere on the page, and develop with students the following understandings: Where else on the page the guide word over column one is listed. Where else on the page the guide word over column two is listed. What the guide words at the top of the page indicate with regard to all words listed on the page.	4. Q: Is the guide word, liquid air, listed any place else on the page? Where? A: The guide word, liquid air, is the first entry word in column one. Q: Is the guide word, litre, listed any place else on the page? Where? A: The guide word, litre, is the last entry word in column two. Q: Because the guide words are listed as the first and last entry word on the page, what does that indicate to you? A: We do not know. Say: All the words that fall alphabetically between the words liquid air and litre are listed on this page. Q: Would the word, literal, be located on this page? Why? A: Yes, the word, literal, would be located on the page because its third letter, t, alphabetically comes after the third letter, q, in the first entry word, liquid air, and its fourth letter, e, comes before the fourth letter, r, in litre, the last entry word on the page. Q: Would the word launch be listed on this page?

PROCEDURE	DEVELOPMENT
	4. A: No, the word launch would not be listed on this page because its second letter, a, alphabetically comes before the second letter, i, in the first entry word, liquid air.
5. Have students explain how they use guide words to help them determine whether or not a word is located on a specific page of the dictionary.	5. Q: How can you use guide words to help you locate a specific word in the dictionary? A:a. We locate the guide words on a specific page of the dictionary and we then know the first and last entry word on that page. b. We examine the word we are trying to locate to see if, alphabetically, it comes between the first and last entry word on the page. c. We decide whether the specific word is located on, before, or after this page.
6. List specific guide words on the board, and using procedures outlined in steps 4 and 5, give students practice in determining whether or not a group of words, similar to that at the right, is located on the page with these guide words.	6. Say: Decide whether or not the following entry words are located on the page with the following guide words: read-------------------reason a. react b. realm c. recall d. reap Say: Give reason for your decision. A:a. The word react is not on this page because the letter c in react, alphabetically comes before the letter d in read, which is the first entry word on the page. b. The word realm is listed on this page because the letter l in realm, alphabetically comes after the letter d in read, the first entry word, and before the letter s in reason, the last entry word on the page. c. The word recall is not on this page because the letter c in recall, alphabetically comes after the a in reason which is the last entry word on the page. d. The word reap is listed on this page because the letter p in reap, alphabetically comes after the letter d in read, the first entry word, and before the letter s in reason, the last entry word on the page.
7. Through questioning similar to that at the right, have students explain the information they have learned which will help them use a dictionary more efficiently.	7. Q: What have you learned about using a dictionary more efficiently? a. We have learned to turn immediately to the section of the dictionary which contains

PROCEDURE	DEVELOPMENT
	7. Q:a. (Continued) words beginning with the initial letter of the word we are trying to locate. b. We have learned that two guide words located at the top of every page indicate the first and last word entered on that page. c. We have learned to use guide words as an aid in determining whether or not a word is located on a specific page.

A Final Note

Separate lessons are indicated in order to develop the following dictionary skill:

> The use of the dictionary as a source for finding the exact meaning of a word according to context requirements. Example: The judge will pass sentence on the guilty person. Dictionary meanings: pass - written permission; transfer the ball; a free ticket; express or pronounce; be successful in; narrow path through mountains, etc., etc. The underlined meaning is the correct one because a judge expresses or pronounces sentence on a guilty person.

LESSON II

Problem: Instruction is needed in the use of the dictionary as an aid in pronouncing words.

Required Skill: Understanding the need for pronunciation keys in dictionaries, and how to use these keys.

PROCEDURE	DEVELOPMENT
1. Present two words to the class, each word containing the same combination of letters. Direct students to note the spelling of each word as it is pronounced.	1. Write on board: brook, brood Say: Look at the spelling of the words on the board as they are pronounced. (Call on student to pronounce the words.)
2a. Question students about the spelling of the words and the differences in their pronunciation.	2a. Q: What did you notice about the spelling of each word as it was pronounced? A: Each word contains the same combination of vowel letters, oo, but this combination is pronounced differently in each word.
b. Continue questioning to determine the difficulty that might be encountered by someone not familiar with the pronunciation of words that contain the same combination of letters.	b. Q: What might a person who did not know the pronunciation of the words think about the pronunciation of, brook and brood, since both words contain the same vowel letters? (oo) A: Someone might think that the two vowels (oo) in each word would sound alike. Say: It is very important when meeting a word which you cannot pronounce to know that

PROCEDURE	DEVELOPMENT
	2b. Say: (Continued) a letter of the alphabet (or a combination of letters similar to those in the above words) may represent more than one sound.
3. Elicit from students the aid that will help them to pronounce words.	3. Q: What aid do we have to help us pronounce unfamiliar words? A: The dictionary is a definite aid in pronouncing new words.
4. Using the dictionary, have students locate the first word on the board. Point out the phonetic spelling of the word that appears next to the entry word in the dictionary. Write this phonetic spelling on the board.	4. Say: Locate the word, brook, in your dictionary. (Example used: Thorndike-Barhnart Junior Advanced Dictionary) Note the phonetic spelling of the word that appears in parenthesis next to the entry word. (brůk). This spelling indicates the pronunciation of the word, brook. (Write it on the board.)
5. Direct students to examine the markings and the phonetic spelling of the word and have them locate the pronunciation key in their dictionaries. Question sutdents about the pronunciation of similar markings in a familiar word in the pronunciation key. Have students pronounce the word.	5. Say: Note the mark over the letter, u, in the spelling (brůk). Locate the pronunciation key at the bottom of the next page. Try to find similar markings in a familiar word in the key on this page. Q: Did you find a familiar word with similar markings in the pronunciation key? A: Yes. In the word, půt, the letter u has the same markings as in brůk. Q: Pronounce the word. A: brůk equals brook.
6. Have students refer to their dictionaries to determine the correct pronunciation of the second word on the board.	6. Q: How does your dictionary indicate the pronunciation of the word, brood? (Allow time to locate the word.) A: Next to the entry word in the dictionary is the phonetic spelling and markings of the word. (brüd). The familiar word, rüle, in the pronunciation key has the same markings as in brüd. Therefore the word, brood, is pronounced brüd, as in rüle.
7. Quickly review the steps that may be used to determine the pronunciation of a word in the dictionary.	7. Say: Let's review the steps we can use to go about finding the pronunciation of a word in the dictionary. a. Locate the entry word. b. Note the different markings and phonetic spelling of the word next to the entry word. c. Locate the pronunciation key. d. Find a familiar word with similar markings in the pronunciation key. e. Apply the pronunciation of the markings in the pronunciation key to the pronunciation of the word.

PROCEDURE	DEVELOPMENT
8. Following the steps reviewed above, have students use their dictionaries as an aid in pronouncing another word. Check results. (At this point, the teacher may wish to have the students determine the pronunciation of unfamiliar words by using the key in their dictionaries.)	8. Word to be checked for pronunciation in the dictionary: Entry word - flood Phonetic spelling markings - (flud) Familiar word in pronunciation key - cup
9. Highlight the following: a. The need for a pronunciation key in a dictionary.	9a. Q: Why is it necessary for a dictionary to have a pronunciation key? A: The key is necessary because a letter, or combination of letters, may have more than one pronunciation. Example: brook, brood, flood, each contains oo which has a different pronunciation in each word.
*b. The important facts learned about the dictionary as an aid in pronouncing words.	*b. Q: What facts have we learned about the dictionary as an aid in pronouncing words? A: 1. Next to every entry word is a phonetic spelling of that word, with markings that designate its pronunciation. 2. A dictionary has a pronunciation key which contains familiar words with markings similar to those found in the phonetic spelling next to the entry word. 3. The markings on the familiar word help us to pronounce the entry words.

* There are additional facts pertinent to the use of the dictionary as a pronouncer which are not included in this lesson. Students must be made aware that

1. Every dictionary has a pronunciation key. The markings in the pronunciation key and the location of the pronunciation key vary from dictionary to dictionary. Therefore, it is unnecessary to memorize any one pronunciation key. It is sufficient to know where to locate it and how to use it.
2. More than one phonetic spelling may be listed in a dictionary for a specific entry word. For example, the word, brooch, has two accetpable pronunciations, (brōch, or brüch). However, the first pronunciation is the more acceptable one.

A Final Note

Since the ability to use a pronunciation key involves a series of complex skills, it is helpful, time permitting, for students to receive instruction in all grades on the use of the dictionary as an aid in pronouncing words. For example, in the spelling of words, one consonant may be represented by various letters (or combination of letters); as the sound of the letter, f, is represented by a combination of letters in such words as cough and phone. Again, in the phonetic spelling of words, some letters are not voiced at all, as the letter, e, in the word break, and the letter, a, in the word, creak.

Students must also understand that some vowels letters and some consonants letters represent more than one sound. In the words battle, hatred, altogether, harmful, anywhere, and anon, the vowel, a, has a different sound in each word. In the words saw,was, assure, and measure,the letter, s, has a different sound in each word. Lead students to formulate a conclusion on the basis of instruction given them that the spelling of many words is not a reliable guide to their pronunciation; and because this is so, the dictionary is the best source for determining the correct pronunciation of words.

USING PARTS OF A BOOK

The junior high school student is required to locate specific information in many of the school experiences he encounters every day. He must learn to find this information quickly and easily. To do this, it is necessary that he receive systematic instruction in specific locational reading skills. Lessons I and II that follow, suggest procedures which the language arts teacher may use to instruct students in specific locational skills. For expediency, procedures one and two in Lesson I may be developed in an initial lesson and procedures three through seven in a subsequent lesson. Lesson II may also be developed in two parts--procedures one through six in one session, and procedures seven through ten in another session. Simpler examples may be substituted to meet the needs of the students. In preparing to give this instruction, the teacher must arrange with students in advance to bring to class the appropriate textbook.

LESSON I

Problem: Students indicate a need for instruction in how to use the parts of a book efficiently.

Work-Study Skill: Recognizing and understanding the purpose and use of various parts of a book. (Part I)

PROCEDURE	DEVELOPMENT
1. Use visual materials, the same as or similar to that at the right, and through questioning, develop recognition of book titles as an aid in locating a book appropriate for a given purpose.	1. Display book jackets, or write the following book titles on the board: Our Country's Story Adventures in Reading Exploring New York Famous Mysteries Experimenting in Science Say: Look at the book titles on the board. Silently. Q: If you wanted to read something very exciting for your own pleasure, which of the titles on the board might you select? Why? A: I'd select Famous Mysteries or Adventures in Reading because mysteries and adventures can both be very exciting. Q: Suppose you wanted information on a science problem, which title might you choose? Why? A: I'd choose Experiments in Science because the title suggests that this book contains science information. Q: Which titles suggest that the books contain information concerned with history? A: Our Country's Story and Exploring New York suggest that they contain historical information about our nation and state.

PROCEDURE	DEVELOPMENT
	1. (Continued) Q: In what way does the title of a book guide you? A: A book title guides us in locating a book appropriate for a given purpose because the title often suggests the information contained in the book.
2. Direct students to place a specific textbook on desks, and through questioning, develop recognition of the purpose and use of the following information located on the title page of the text: a) Title (Cover of text)	2. Say: Place your science texts on your desks. a) Q: What is the title of the textbook? What does the title suggest about the contents of the text? Where else may we find this title printed in the textbook? A: The name of the text is You And Your Inheritance - Science For Better Living. The title tells us that this book contains scientific information. We can also find this title on the first page printed in the book.
b) Title Page	b) Say: Turn to the first printed page. Q: What do we find on this page? A: We find the title of the book, the authors' names and the publisher's name on this page.
1) Title	Title: You And Your Inheritance - Science For Better Living
2) Author	Authors: Brandwein, Hollingworth, Beck, Burgess.
3) Publisher	Publisher: Harcourt, Brace and Company, New York - Chicago. Say: This page is called the title page because it repeats the title which suggests the possible contents of the book.
c) Copyright date	c) Say: Turn to the reverse side of the title page. Q: What do you find on the reverse side of the title page? A: The date when the book was copyrighted. (Copyright, 1953 and 1956) Q: What does the word, copyright, mean and why is knowing the copyright date important to you? A: The word copyright means that no one has the right to copy the book, in whole or in part, because it is protected by law as of a specific date. The copyright date is a guide to the time factor of the information contained in the book. Q: If you were looking for information on the atomic testing in 1962, would you find it in this science book? A: No. Information on events occurring in 1962 would not be found in this book because this

PROCEDURE	DEVELOPMENT
	2. A. (Continued) text was copyrighted in 1956, six years previous to the year required by the question.
3a. Briefly review the purpose and use of the title page of a text and through questioning, have students locate another part of the textbook (table of contents) which offers an overview of the contents of the book.	3a. Say: The title page gave us definite information about the textbook. It gave us its title, its authors, its publishers, and its copyright date. It gave us an overview of the book's contents. Say: There is another part of your text that acts as a guide to more detailed information about the contents of this text. This part is located very near the title page. Find it. Q: Have you located the part of this text that offers more details about the book's contents? What is this part of the book called? A: Yes. This part of the book is called the table of contents.
b. Have students examine the table of contents in their texts and develop recognition of the purpose and use of this part of a textbook.	b. Say: Examine the table of contents and look at the way it is arranged. Q: Would you say that the table of contents suggests more detailed information than that suggested by the title? Why? A: Yes. The table of contents lists the names of the broad topics or units contained in the text as they appear in the text from the first through the last page. The title of the text just offered an overview of the contents of the book as a whole.
c. Have students locate specific units in the table of contents.	c. Q: What is the title of Unit One and Unit Four listed in the table of contents? On what page is each unit located? A: Unit One is "You and Your Future" located on page 19. Unit Four is "The Gift of New Materials" located on page 169.
4. Through questioning, elicit from students the possible difficulty they might encounter in trying to locate in the table of contents specific information on a minor point.	4. Q: Suppose you wanted to locate information on a blast furnace. Would the table of contents guide you? Why not? A: The table of contents would not guide us in locating information on a blast furnace because it lists only large units of work contained in the text. It does not include a detailed listing of topics within each unit.
5. State that there is a part of the text that acts as a guide to locating specific information contained in the book. Through questioning, elicit from students the following points of information:	5. Say: There is another part of the book that might help you locate the pages in the book that contain specific information on a blast furnace.

PROCEDURE	DEVELOPMENT
5. (Continued) a. Where this part of the book is located. b. What this part is called. (index)	5. Q: Does anyone know where in the book more details about the book's contents is located? What is this part of the book called? A: There is a more detailed listing of information about the contents of the book located in the back of the book. This part of the book is called the index.
6. Direct students to turn to the index in the back of their texts. Have students briefly examine the index and through questioning, elicit from them the chief difference between the table of contents and the index.	6. Say: Turn to the index at the back of your text. (P. 459) Examine it briefly. Q: Would you say the index differs from the table of contents? How? A: Yes. The index is different from the table of contents. The index gives a more detailed listing of specific information contained in the book. It is arranged alphabetically by topics, each topic followed by the page numbers on which the specific information is located in the text. The table of contents lists only the broad units covered in the text, as they appear from the first to the last page of the text.
7. Have students locate in the index the page number on which information on a specific topic is located.	7. Say: See if the index guides you to information on a blast furnace. Q: Did the index guide you to the page of the text where information on a blast furnace is located? A: Yes. Information on a blast furnace is located on page 216 in the text.
8. Tell students that many texts have a part which acts as a guide to the meaning of words contained in the text. (glossary) Tell students where the glossary is generally located and direct them to locate the glossary in a specific text. Through questioning, elicit from students the similarity and difference between a glossary and a dictionary. (Make clear to students that all texts do not contain glossaries. Authors often make other provisions for understanding the words used in a text.)	8. Say: Many texts have another part which guides us to the meaning of words contained in the text. This part is called a glossary and is usually located in the back of the book, just before the index. Find the glossary in your text. (p. 451) Examine it briefly. Q: How is a glossary like a dictionary? A: It is composed of words and their meanings listed alphabetically, just as in a dictionary. Q: How does the glossary differ from the dictionary? A: The glossary only lists words used in the contents of the book whereas the dictionary lists many other words besides those in the glossary. Say: All texts do not contain a glossary. Some texts contain word lists at the end of each unit or chapter. These lists take the place of a glossary.

PROCEDURE	DEVELOPMENT
9. Through questioning similar to that at the right, review the purpose and use of the following parts of a book: a. Title of book b. Title page c. Table of contents d. Index e. Glossary Write each part on the board as given by the students.	9. Say: Name the various parts of a book studied today and explain how each part acts as a guide to the contents of the book. a. The title acts as a guide to the general contents of the book. b. The title page acts as a guide to the name of the book, its authors and its publishers. The reverse side of the title page lists the copyright date which guides us to the time factor of information contained in the book. c. The table of contents gives an overview of the contents of the book by listing the broad topics or units as they occur from the first to the last page of the book. d. The index is located at the back of the text. It offers a detailed listing of the contents of the text arranged by topics in alphabetical order, each topic followed by the page numbers on which information is found in the text. e. The glossary, located just before the index of the text, is similar to a dictionary in that it is a guide to the meanings of words used in the contents of the book.

LESSON II

Problem: Students require detailed instruction on the use of an index.

Work-Study Skill: Developing the ability to use the index of a textbook efficiently. (Part II)

PROCEDURE	DEVELOPMENT
1. Through questioning, quickly review previous learnings on recognizing the purpose and use of various parts of a textbook. (See Step 9 in Lesson I)	1. Parts of a Book Title Page Reverse side (copyright date) Table of Contents Index Glossary
2. Write topic on the board and question to elicit the fact that topics such as this are located in the index. State that there is an efficient way to use the index of a text.	2. Topic: Testing for fats and oils Q: What part of the book would indicate where in the contents we could find information on this topic? A: The index would list the page on which this information can be found.

PROCEDURE	DEVELOPMENT
	2. Say: We shall learn how to use the index of a text efficiently.
3. Write a problem on the board, the same as or similar to that at the right. Have students examine the problem, and through questioning, elicit from them the fact that the index lists only the important words in a problem.	3. Write on board: "How do we test for starch, using iodine?" (a problem related to the unit, Growing Your Food.) Say: You decided that the index of the text would contain a listing of the pages on which information on this problem is located. Q: Do you think an index lists each and every word in a problem? Why not? A: No. The index doesn't list every word in a problem. That would make the index much too long and difficult to use. The index lists only the important words contained in a problem.
4. Have pupils select the most important words in the problem, in the order of their importance. Underline the important words on the board. (Step 1)	4. Say: Read the problem and select what you believe is the most important word in it. Q: What did you select as the important word in the problem? Why? A: The word, starch, is the most important word in the problem because it is connected with the unit we are studying. (Underline the most important word in the problem. This is the topic.)
5. Question to determine why students did not select the word, test, as the most important word in the problem.	5. Q: Why didn't you choose the word, test, as the most important word in the problem? A: There are many different kinds of tests. We are only interested in testing for starch. The word, test, is next in importance in the problem. (Underline the word test on the board. This is a sub-topic.) Q: Is there any other word that might be important in the problem? Why is it important? A: The word, iodine, is also important because it defines the specific test for starch that is required. (Underline the word, iodine, on the board. This is another sub-topic.)
6. Elicit from students the following points of information regarding the most important word in the problem: a. Its initial letter. b. Its probable location in the index. (Step 2)	6. Say: The most important word in the problem is starch. Look at the initial letter of the word, starch. (the letter, s) Q: In which part of the index do you expect to find a listing of words that begin with the letter, s? A: Words beginning with the letter s are located toward the end pages of the index.

PROCEDURE	DEVELOPMENT
7. Direct students to locate the topic in the index, and through questioning, elicit from them the page number on which this word is located. Write the page number on the board. (Step 3)	7. Say: Locate the word, starch, in the index as quickly as possible. Q: On what page is the word, starch, listed? A: The word, starch, is listed on page 467 in the index.
8. Draw students' attention to the printed material following the most important word. Have students read this material and through questioning, elicit from them the following information: a. What this printed material contains. b. The arrangement of this material.	8. Say: Note the printed material following the word, starch, on page 467. Read through this material carefully. a. Q: What does this material contain? A: The material following the word, starch, contains a listing of words and phrases that relate to the main topic-starch. Say: The words and phrases following the word, starch, are called sub-topics because they relate to the topic. b. Q: How are these sub-topics arranged? A: The sub-topics are in paragraph formation, beginning immediately after the word, starch, and continuing-indented just a little-to make it easier to recognize that they relate to this topic.
9. Direct pupils' attention to the punctuation mark: a. That separates one sub-topic from another, (a semi-colon) b. That separates a topic from its sub-topics, (a comma) c. That separates a page number from the sub-topic, (a comma)	9. Q: What punctuation mark is used to separate one sub-topic from another? A: A semi-colon separates the sub-topics from each other. Q: How is a comma used? A: Commas are used to separate the word, starch, from its sub-divisions and to separate the page numbers from the sub-topic.
10. Through questioning similar to that at the right, elicit from students the page numbers on which information on the specific problem is located, (Step 4) and develop an understanding of the purpose of the bold-faced type used to indicate a specific page number.	10. Q: As you read through the sub-topics of the word, starch, did you locate the page numbers on which information on our problem, how we test for starch, using iodine, may be found? What page numbers did you find listed? A: Yes, testing for starch with iodine is located on page 187, **187**, and 188. Q: Do you notice the bold-faced type used to indicate page 187? Why is this bold-faced type used? A: The bold-faced type indicates an illustration on page 187.
11. Demonstrate to students how to read the subdivisions of a specific topic in the index, and give students practice in reading the remaining	11. Say: Note that the word, starch, is only printed once and that each sub-topic after it seems to be incomplete unless the word, starch, is

PROCEDURE	DEVELOPMENT
11. (Continued) sub-topics listed after it.	11. (Continued) added to it. (The topic is sometimes read following the sub-topics, etc.) Example: starch, carbon made from, 187, **187**, 188; This must be interpreted: carbon made from starch is located on p. 187 and 188. Q: What is the next sub-division? A: starch..............; composition of, by green plants, 131, **131**, 132, 133 This must be interpreted: composition of starch by green plants is located on p. 131, 132, 133, and 134. An illustration is located on p. **131**. (Students continue reading the remaining sub-topics of the topic, starch.)
12. Through questioning, review the four steps developed on how to use the index of a text efficiently. Write the steps on the board or prepare a chart in advance, to use with all classes receiving the same instruction.	12. Q: How do we go about using the index of a text to locate where information on a problem is located? What do we do first? Next? etc. A: In using the index to locate where specific information on a problem is located, we use the following four steps: 1. Read the problem carefully to note the important words in it, in the order of their importance. (topic and sub-topics) 2. Examine the initial letter of the topic to determine the placement of this topic in the index. 3. Locate the topic in the index. 4. Locate in the sub-topics, the page numbers on which information on the specific problem is located.
13. Using techniques described in Steps 1 through 4, write another problem on the board (the same as or similar to that on the right) and give students practice in using the index to locate where in the text information on this problem is located.	13. Problem: "How Green Plants Make Oxygen." (related to unit, Growing Your Food) Topic: Oxygen Sub-topics: Making and Green Plants Index: oxygen, atom of, 170, 173; and burning, 244, 245; making of, by green plants, 127, 130-134; nitrogen changed into, 173; in photosynthesis, 136; in starch, 134, 188

A Final Note

For a more advanced lesson on the use of an index, the teacher may refer to the encyclopedia lesson in the Social Studies chapter. This lesson deals with the index found in a specific encyclopedia and contains detailed explanations of the listings found in this type of reference.

CONCLUSION

Many of the lessons contained in the various subject areas may be used by the language arts teacher for instructional purposes. The following lessons are appropriate for readers achieving at or about grade level:

SKILL	SUBJECT AREA CHAPTER
Word Meanings	Social Studies
	Science
	Mathematics
	Industrial Arts
Finding Main Idea	Social Studies
Understanding Problems	Mathematics
	Science
Skimming	Social Studies
Outlining	Social Studies
Distinguishing between Fact and Opinion	Social Studies
Organizing and Classifying	Science
Interpreting Maps	Social Studies
Interpreting Graphs	Social Studies
Interpreting Diagrams	Science
	Industrial Arts
Following Directions	Science
	Industrial Arts

Lessons geared for the severely retarded reader in the junior high school are located in the appendix following this chapter. These lessons develop such skills as the use of phonetic analysis in recognizing words, the use of structural analysis in recognizing longer words, and the use of the dictionary.

APPENDIX

THE RETARDED READER IN THE LANGUAGE ARTS PROGRAM

The retarded reader in the junior high school needs continued instruction in the basic reading skills he has not mastered. While these skills are on an elementary level, they are essential to efficient reading and it is the responsibility of the language arts teacher to give this instruction. The needs, interests, and maturity level of the junior high school student must be considered in the development of these skills.

The publication "The Retarded Reader in the Junior High School" (Board of Education of the City of New York, 1952) suggests appropriate methods and materials of instruction (see pages 60-116). This publication is recommended for all teachers because it furnishes an excellent overview of the development of vocabulary, comprehension, and special study skills.

To supplement the information contained in the foregoing publication, detailed lesson plans are included in this Appendix. These lessons will assist the language arts teacher in instructing the severely retarded reader in the junior high school. Five full-period lessons develop the following skills:

Using phonetic analysis to recognize words
Using structural analysis to identify longer words
Using the dictionary

In order to further aid the retarded reader in the junior high school, the language arts teacher also may develop more advanced reading skills. To do this, the teacher may use content material taken from any or all subject areas. Therefore, many of the lessons contained in the body of this manual may be adapted by the teacher for instructional purposes. These include lessons for developing the ability to use contextual clues in word recognition and for finding the main idea through the use of social studies material.

Work-study lessons which may be adapted by the language arts teacher are entitled Skimming and Surveying, Reading and Interpreting Graphic Materials, and, Reading and Following Printed Directions.

The exact procedures in each of the foregoing lessons should be followed as listed in Column I in each case. However, the material for developing the procedures may be too difficult for retarded readers. The teacher should substitute appropriate materials adapted to the needs of the students.

USING PHONETIC ANALYSIS TO RECOGNIZE WORDS

The ability to use phonetic analysis to recognize words known orally, or to pronounce new words, is most important to efficient reading. This ability includes recognition of initial consonant sounds, final consonant sounds, double consonant sounds, consonant blends, and vowel sounds. Lessons I and II that follow suggest methods of procedure and specific examples which the language arts teacher may use to develop specific phonetic analysis skills. These lessons are intended for the beginning reader in the junior high schools, and may be adapted for instructing the non-English speaking student. This adaptation involves a simplification of the questioning in column II and an increase in the oral repetition of new vocabulary contained in the lesson. The teacher may "upgrade" or "downgrade" the specific examples depending upon the needs, interests, and maturity level of the students.

In preparation for these lessons, it is essential that the teacher review the names of the letters of the alphabet, identify the vowels and consonants by letter names, and give practice in checking the vowel and consonants found in many one syllable words.

LESSON I

Phonetic Analysis Skill: Developing recognition of a specific consonant blend to aid in recognition of words known orally, or in the pronunciation of new words. (In developing this skill, please note that students are required to recognize sounds only as they appear in words. Students are never required to sound any letter or letters in isolation.)

APPROACH

Procedure	**Development**
1a. Relate an experience, the same as or similar to that at the right.	1a. Say: Listen to this experience John had. John made a telephone call to a friend. The friend called him by name as soon as John had said 'hello'. John didn't have to tell him his name at all in order to be recognized.
b. Through questioning, elicit from students the possible relationship that exists between the familiar experience and reading.	b. Q: How do you think the friend was able to recognize John before he could tell his name? A: The friend recognized John because he was familiar with the sound of John's voice. It sounded "high", "low", etc. Q: Can you think of any relation that exists between recognizing John because of the familiar sound of his voice and recognizing new words because we are familiar with the sounds contained in the new words? A: Yes.If we are familiar with the sounds that are contained in new words, then we may easily recognize the words as we read.

Procedure	**Development**
2. Question to elicit the purpose of the lesson and write it on the board.	2. Q: What do you think we shall learn in reading today? A: We shall learn how a familiar sound can help us to recognize words known orally or to pronounce new words. (Write aim on the board.)

DIRECT TEACHING

1. Present to class three familiar objects, the same as or similar to those at the right. Through questioning, elicit the names of the objects and write the names on the board.	1. Show the following familiar objects- piece of string book strap drinking straw Q: What are these objects? A: Piece of string Book strap Drinking straw List on the board: string strap straw
2. Have a student read the three words on the board aloud and direct the class to listen carefully for the part of each word that sounds exactly the same. Put a box around the part of each word that sounds the same.	2. Say: While Lily is reading the words on the board, the rest of the class listen very carefully to hear the part of each word that sounds exactly the same. Q: Were you able to hear the part in each word that sounds exactly the same? A: Yes. Say: Draw a box around the part of each word that sounds the same. (Call on a student.) $\boxed{\text{s t r}}$ i n g $\boxed{\text{s t r}}$ a p $\boxed{\text{s t r}}$ a w
3a. Through questioning, have students note that the boxed off sound is made up of three consonants, and tell students the name given to a sound made up of three consonants blended together as one. (consonant blend)	3a. Say: Examine the boxed off sound in each word. Q: How many consonants make up this one sound? A: The sound is made up of three consonants. Say: We call a sound made up of three consonants blended together as one, a consonant blend.
b. If necessary, use a familiar experience to clarify concept of consonant blend.	b. Blending ingredients in cake baking, voices blended in song, etc.
4. Draw students' attention to the position of the consonant blend in each word and tell students the name given to a consonant blend in this position. (initial consonant blend)	4. Say: Note that the consonant blend in each word is found at the beginning of the word. We call this an initial consonant blend.

Procedure	Development
5. Read to class a group of words, the same as or similar to the ones at the right, and tell students to listen carefully for the words that begin with the same consonant blend. (Auditory Discrimination) Check students' answers and write on the board the words that begin with this consonant blend. Have a student underline the initial consonant blend in each word. (Visual Discrimination)	5. Say: Listen carefully to this group of words. Note the words you hear that begin with the same blend as the word straw. still strong stripe spin street Q: Which words did you hear beginning with the same blend as in the word straw? A: strong stripe street Write the words on the board as students give them to you, and have a student underline the initial consonant blend in each word.
6. Drill on recognition of this consonant blend by having students solve riddles, the answers to which have to begin with the same consonant blend. Write the correct answers on the board. Have the answers read aloud and have a student underline the initial consonant blend heard in each answer. (Auditory and Visual Discrimination)	6. Say: I know you like to solve riddles. See if you can solve these riddles. Remember that each answer must begin with the same sound as in straw. Riddles: I'm thinking of a word that has the same meaning as brook. (stream) What is the opposite of crooked? (straight) What is used to carry someone hurt in an accident? (stretcher) Write the answers to the riddles on the blackboard. Have a student underline the same initial consonant blend in each word.
7. Continue to drill on recognition of this consonant blend by reading sentences to class and and having students count the number of words they hear beginning with the same blend. Check students' answers by writing the correct words on the board and underlining the same consonant blend in each word.	7. Say: As I read these sentences to you, listen for the words that begin with the same blend as in straw. The strong swimmer crossed the stream with swift strokes. (Three words begin with the same blend as in straw: strong, stream, strokes.) The stray dog was found on Fifth Street. (Two words begin with the same blend as in straw: stray and street.)
8. Using examples the same as or similar to those at the right, have students build words by substituting the consonant blend for underlined letter or letters in words. Have students check their answers by writing new words on the board.	8. Write on board: sing law speak team bike Say: Build other words by substituting the consonant blend as in straw for the underlined letter or letters in each word.

Procedure	**Development**
	8. A: sing : string law : straw speak : streak team : stream bike : strike

SUMMARY

1. Refer to the purpose of the lesson written on the board, and through questioning, have students decide whether or not the purpose was achieved.	1. Q: What did we say we were going to do today? Did we accomplish our purpose? How? A: We were going to learn how recognizing a familiar sound can help us to recognize words. We did accomplish our purpose. Since we are now familiar with the consonant blend as in straw, we can recognize many words as we read.
2. Have students read aloud the words recognized because they are now familiar with the consonant blend as in the word straw. Have students copy these words in their notebooks, underlining the initial consonant blend in each word.	2. Say: Read aloud the words you recognize because you are familiar with the initial consonant blend as in straw. Examples: straw, strap, string, strong, stripe, street, strain, streak, stream, straight, strokes, stray etc. Say: Copy the words above into your notebooks. Underline the familiar consonant blend in each word.

FOLLOW-UP ACTIVITIES

Reinforce the learnings of this lesson by having pupils practice word-building activities, the same as or similar to the ones at the right.	Practice Exercises Substitute the initial consonant blend as in straw for the underlined letter or letters in the following sentences: The plane had no wing. (string) He was a wrong choice as a leader. (strong) Do you know how laws are made? (straws) Look down at your feet. (street) Complete the following sentences by selecting the correct word from the words listed below: straw - string - strike - streak Tom had a long_______on his kite. The men were not working because they were on______ . Horses sleep on beds of_______.

A Final Note

The sequential steps described in the direct teaching of the preceding lesson, steps 1 - 8, may be used to develop recognition of initial consonant sounds, final consonant sounds, and consonant blends.

Examples:

Consonants
b, g
c, h
d, l
f, etc.

Consonant Blends	
bl, fr, sc,	spr, spl
gl, tr, tw,	scr, squ
cl, dr, st,	shr, etc.
sl, cr, etc.	

The dictionary is the source for finding specific examples to clarify each step in the procedures of the lesson.

LESSON II

Phonetic Analysis Skill: Developing recognition of visual clues to the short vowel sound in words of one syllable.

APPROACH

	Procedure		Development
1.	Make a statement, the same as or similar to the one at the right, with regard to the contents of every word in the English language. Question students about the meaning of the statement. Prove the validity of the statement.	1. Say:	Listen to this true statement: "Every word in the English language contains at least one sounded vowel."
		Q:	What does this statement mean?
		A:	It means that every word in our language contains the sound of at least one vowel.
		Q:	Do you think that even very short words, words of one syllable, contain at least one sounded vowel? A: Yes.
a.	List on board one syllable words to prove the validity of the statement.	a. Say:	We'll try to prove the validity of the statement. Here are some one syllable words you know.
		A:	(Write on board) a - as in a book an - as in an apple the - as in the desk
b.	Underline the vowel in each word.	b. Q:	Is there a vowel in each of the words? A: Yes. Underline the vowel: a an the
c.	Say the words orally, directing students to listen to the vowel sound in each word.	c. Say:	Note the same vowel in a and an. Listen as I say these words. (Say the words a and an.)

Procedure	Development
	1c. Q: Did you hear the sound of the vowel in each word? A: Yes.
d. Draw students' attention to the difference or similarity in the vowel sounds.	d. Q: Did the vowel sound the same or different in each word? A: The vowel sounded different in each word. Say: Now listen to the sound of the vowel in this word. (the) Tell students that the vowel in the word the sounds the same as the vowel in the word a. Say: Even the above one syllable words contained a sounded vowel. Therefore, the statement about every word in our language containing a sounded vowel is a true one.
2. State that vowels have many different sounds and that there are visual clues that help to determine the vowel sound in words of one syllable. Through questioning elicit the purpose of the lesson from the students and write it on the board.	2. Say: You noticed that the one vowel had different sounds. There are clues you can see to help you recognize the vowel sound in many one syllable words. (Visual Clues) Q: What shall we learn in reading today? A: We shall learn to recognize some clues to vowel sounds in words of one syllable. (Write aim on board.)

DIRECT TEACHING

Procedure	Development
1. Have students examine a list of one syllable words, each beginning with the same vowel. (Use the list at the right or a similar one.) Have a student underline the vowel in each word. Read the words aloud. Direct students to listen to the sound of the vowel in each word. Through questioning, have students identify the vowel sound as the same in each word. Tell them what this vowel sound is called. (Short vowel sound.) Through questioning lead students to recognize the clue to the short vowel sound in these one syllable words. (Visual Clue I)	1. Say: Look at this list of one syllable words: ad Al am as at, etc. Charles, please underline the vowel in each word. Say: As I read these words aloud to you, listen to the sound of the underlined vowel in each word. Q: Did you hear the sound of the vowel in each word? What did you notice about the vowel sound you heard in each word? A: The vowel sound was the same in each word. Say: The vowel sound you heard in each word is called a short vowel sound. (ă) Q: Do you see any clue to the short vowel sound in the words on the board? A: Yes, the single vowel at the beginning of a one syllable word is usually a clue to the short sound of the vowel. (Visual Clue I)

Procedure	Development
2. Have students examine another list of one syllable words where the vowel is in the middle of each word. (Use the list at the right or a similar one.) Follow the techniques described in step 1, above, and through questioning, lead students to recognize the visual clue to the short vowel sound in one syllable words where the vowel is in the middle of each word. (Visual Clue II)	2. List of one syllable words with the vowel in the middle of each word: had bad gal cad lad Sal dad mad ham a. Underline the vowel in each word. b. Read words aloud and have students listen for the sound of the vowel in each word. c. Identify the vowel sound as the same in each word. d. Tell students each word contains a short vowel sound. (ă) e. Look for a clue to the short sound of the vowel in each word. Visual Clue II: A single vowel in the middle of a one syllable word is usually a clue to the short sound of the vowel.
3a. Review the two visual clues to the short vowel sound in words of one syllable. Visual Clue I - Step 1 Visual Clue II - Step 2	3a. Q: What two clues will help you to recognize the short vowel sound in one syllable words? A: Visual Clue I: The single vowel at the beginning of a one syllable word is usually a clue to the short sound of the vowel. Visual Clue II: A single vowel in the middle of a one syllable word is usually a clue to the short sound of the vowel.
b. Apply the clues to additional words containing the same vowel sound.	b. Use the dictionary to locate additional words.
4. Use the techniques described in steps 1 and 2 of the Direct Teaching Procedures to check on recognition of the visual clues to the short sound of other vowels in one syllable words. Use the list of words to the right, or a simialr list. (It is suggested that steps 1, 2, and 3 be developed in one lesson and step 4 be developed in several subsequent lessons, depending upon the needs and ability levels of pupils. Have pupils apply the learnings of each lesson to the recognition and pronunciation of words containing similar vowel sounds.)	4. List of one syllable words: Ed Ned keg egg bed leg, etc. led if is sit in Bill his it tin bit, etc. odd don rod on cod Tod, etc. pod up cup bus us pup Gus, etc. sup

SUMMARY

Procedures	**Development**
Through questioning, highlight the visual clues to the short vowel sound in words of one syllable.	Q: What clues may we look for to help us recognize the short vowel sound of the letter a in one syllable words? A: a. A single vowel at the beginning of a one syllable word. b. A single vowel in the middle of a one syllable word.

A Final Note

Separate lessons are indicated to develop recognition of the following visual clues to vowel sounds in one syllable words:

a. A single vowel at the end of a one syllable word is a clue to a long vowel.
Examples: why - cry

b. Two vowels together in a one syllable word indicate a long vowel sound.
Examples: mēat - bōat

c. Two vowels in a one syllable word, one of which is a final e, indicate a long vowel sound.
Examples: fāce - lōne

d. A vowel followed by the letters, r, l, or w, is neither long nor short, but is controlled by these letters.
Examples: all, art, saw

The procedures used to develop recognition of the visual clues to the short sound of vowels in Lesson II may be used to develop any of the visual clues to vowel sounds listed in a - d above. The teacher simply substitutes examples to develop recognition of the specific visual clue.

USING STRUCTURAL ANALYSIS TO IDENTIFY LONGER WORDS

The ability to analyze the structure of words, using familiar portions to pronounce the words and to estimate their meanings, is a definite aid to word recognition and understanding. This ability includes the following sequence of skills:

1. Identifying the root of longer words: impossibility, racing, comical.
2. Identifying and understanding the importance of common prefixes and suffixes: re, ad un, in, dis, ex, er, or, less, ful.
3. Estimating the meaning of new words through familiar portions: in compound words, playground; handshake - in longer words, unconstitutional; irregularity.
4. Recognizing differences in meaning or in shades of meaning in accordance with the accent: ob'- ject and ob - ject', des'- ert and de - sert'.

Before receiving instruction in the first skill listed above, students should be able to identify root words in longer words: as date, dating; hire, hiring, etc. This involves an understanding of the following phonetic analysis skill: In one syllable words that contain two vowels, one of which is a final silent e, a long vowel sound is usually given the first vowel letter. Examples: hire, date, etc.

Lessons I and II that follow suggest methods of procedure and offer specific examples which the language arts teacher may use to develop and implement specific structural analysis skills. In preparation for these lessons, it is essential that students are able to identify the syllables in two syllable words.

In Lesson I, separate lessons may be indicated if students are very severely disabled readers. The lesson may be broken down into two separate parts, first, to use familiar portions of compound words as an aid to pronouncing the words, and second, to use the familiar portions of compound words as an aid in estimating the meanings of the words. The teacher should keep in mind the ability and interest level of the students so that the examples can be "upgraded" or "downgraded" according to the needs of the students.

LESSON I

Structural Analysis Skill: Using familiar portions of compound words as an aid in pronouncing the words and as a possible aid in estimating their meanings.

APPROACH

Procedure	Development
1. Describe an incident in which a problem arose that needed immediate solution. (Use the incident to the right or a similar one.) Through questioning, elicit from students their suggestions on the solution of the problem. (See solution to the right.)	1. Say: A scientist, a rock specialist, discovered a very unusual rock in his travels about the country. He wanted to examine the formation of the rock in his laboratory, but it was much too heavy for him to lift. Q: What do you think the scientist could do to solve his problem? A: The scientist could use a pickax to break the rock into parts so that he could carry a portion of the rock to his laboratory for examination.

Procedure	Development
2. Repeat the solution to the foregoing problem, and show students the relationship that exists between the solution of this problem and the problem of encountering long words in reading. Through questioning, elicit from students the purpose of the lesson and write it on the board.	2. Say: The scientist was able to break up the rock into smaller parts so that he could examine it. When we meet a long word in our reading, we can't take a pickax to break it up as the scientist did to the rock. We can only try to break the long word into familiar portions to help us pronounce the word and sometimes, to figure out its meaning. (estimate) Q: What is the purpose of our reading lesson today? A: To use familiar portions of long words to help us pronounce the words and to try to estimate their meanings. (Write aim on board.)
DIRECT TEACHING	
1. Write sentences on the board. Include in the sentences, compound words, each composed of two words written together as one. (Use the sentences to the right, or similar ones.)	1. Sentences on board: a. The boy was shortchanged by the storekeeper. b. The driver sideswiped the new car. c. The cutout on the sports car made a very loud noise. d. The record of the voyage was kept in a logbook.
2. Direct students as follows, step by step, and through questioning similar to that at the right, develop the lesson:	2. Say: Follow my directions.
a. Read sentence one silently and examine the form or structure of the underlined words in the sentence.	a. Read the first sentence silently and examine the form of the underlined words in the sentence.
b. Separate each underlined word into its familiar parts, and pronounce each whole word.	b. Q: Do you notice anything about the form or structure of the underlined words? A: The words are each composed of two familiar words: short changed store keeper Say: Because you recognize the two familiar words in each underlined word, you are able to pronounce the underlined words.
c. Consider the meaning of each familiar part.	c. Say: Think of the meaning of the familiar words in short changed and store keeper.
d. Try to estimate the meaning of the whole word, as it is used in the sentence.	d. Q: Do the meanings of the familiar words give you a hint to the meaning of each whole word?---Can you estimate the meaning of each whole word?--- A: Yes, the word shortchanged in this sentence means that less than the correct amount of change was given (Informal-U.S.)

Procedure	Development
	2d. A: (Continued) and the word storekeeper means the man who runs the store.
e. Use the dictionary to find the exact meaning of the word if it cannot be estimated from the meaning of its familiar parts.	e. Say: By using the familiar parts of each word, we were able to pronounce the words and estimate their meanings. Say: Sometimes we are not able to estimate the meaning of a long word even though we are familiar with its parts. Then we must use the dictionary to find the exact meaning of the word as it is used in the sentence.
3. Tell students the name given to words composed of two whole words pronounced as one.	3. Say: We call words composed of two whole words pronounced as one, compound words.
4. Using the procedures described in step 2, have students analyze the form or structure of the compound word in the second sentence. Through questioning, have pupils discover that they cannot estimate the meaning of this word from its familiar parts but must use the dictionary to determine its exact meaning as it is used in the sentence.	4. Sentence two on board: The driver sideswiped the new car. Q: Do you recognize the two familiar words in sideswiped? A: Yes-side and swiped. (Pronounce the word.) Q: What does the word swiped mean? Possible Student Answer: Swiped to me means snatched or stolen. Say: Then, in this sentence, the word sideswiped would mean that the driver snatched the side of the new car. Obviously, this is not correct.
5. Direct a student to find the meaning of the word in a dictionary on the junior high school level.	5. The dictionary meaning of swipe is to strike a glancing blow. Q: Would the dictionary meaning be appropriate in this sentence? A: Yes, it would mean that the driver hit the side of the new car.
6. Have students analyze the compound words in sentences that remain on the board. Check students' work by having them pronounce the words and attempt to give their meanings. Have students explain whether they were able to figure out the word meanings from their familiar parts or whether they had to use the dictionary to determine their exact meanings.	6. Compound words included in remaining sentences: cutout: meaning cannot be estimated from its familiar parts. Dictionary meaning: a valve in the exhaust pipe of an engine through which gases pass directly into the air. logbook: meaning cannot be estimated from its familiar parts. Dictionary meaning: book in which a daily record of a ship's voyage is kept.

SUMMARY

Procedure	Development
1. Review the purpose and use of analyzing the structure of compound words. Stress the fact that familiar parts of some compound words offer broader hints to their meaning than others.	1. Q: Of what use to you is the ability to analyze the structure of compound words? A: a. It helps us to pronounce the words. b. It sometimes helps us to estimate the meanings of the words. Say: Keep in mind that you must use the dictionary to find the exact meaning of a compound word if you can't estimate the meaning from its familiar parts.

A FINAL NOTE

The following list may be used to give students practice in analyzing the structure of compound words as an aid to pronouncing the words and in estimating their meanings:

roadside
overcoat
nightfall
pancake
lookout
tailwind
breakdown
patchwork
watchdog
raindrops
headlong
boxwood
cattail
footloose
chairman
larkspur
nightclub
instep
buttercup
woodwind

LESSON II

Structural Analysis Skill: Recognizing the pronunciation of two syllable words which look exactly alike but have different meanings.

APPROACH

Procedure	Development
1. Write two related sentences on the board, the same as or similar to those at the right. Read sentences aloud, directing students to listen carefully to the pronunciation of the underlined words in the sentences. Through questioning, elicit the following facts from students:	1. Sentences on board: Today is my son's birthday. I bought him a present and will present it to him tonight. Say: As I read the sentences on the board to you, listen carefully to the pronunciation of each underlined word.
a. The underlined words look exactly alike but each is pronounced differently.	a. Q: What did you notice about the underlined words? A: Both underlined words look exactly alike but each has a different pronunciation.
b. Each of the underlined words has a different meaning.	b. Q: What do each of the underlined words mean? A: The first underlined word, present, refers to a gift and the second underlined word, present, denotes an act of giving.
c. There are two syllables in each underlined word.	c. Q: How many syllables do you hear in each word as I say the words present and present?

Procedure	**Development**
	1c. A: There are two syllables in each word.
d. Students do not know how the pronunciation of each underlined word was determined.	d. Q: How was I able to determine how to pronounce these two syllable words that look exactly alike but have two different meanings? A: We don't know.
2a. State that there is a guide that may often be used to determine the pronunciation of two-syllable words which look exactly alike but which have different meanings.	2a. Say: There is a guide that can help you determine the pronunciation of two syllable words such as these.
b. Elicit the purpose of the lesson from the students and write it on the board.	b. Q: What shall we do today? A: We'll learn a guide to the pronunciation of two syllable words that look exactly alike but have different meanings.
DIRECT TEACHING	
1a. Review the meaning of the first underlined word on the board. By questioning similar to that at the right, elicit from students the fact that the first underlined word refers to an object or a thing. Write the word "Object" on board.	1a. Say: You said that the word present in the first sentence means a gift. Q: Can you actually hold a gift in your hands? Can you touch it? What can we say this meaning of the word represents? A: We can see a gift, touch it, hold it in our hands. A gift is an object or thing. The word present in the first sentence represents an object. (Write the word "Object" on the board.)
b. Direct students to listen to the pronunciation of this word again to see if they can determine the part of the word that receives greater stress.	b. Say: Listen to the pronunciation of the word present that refers to an object or thing. (noun) Q: Were you able to determine the part of the word, present, that received greater stress? A: The first syllable of this word, present, received greater stress.
c. Write the word under the word "Object" on the board and underline the stressed portion of the word. (First syllable)	c. Write the word, present, under the classification "Object" on the board and underline the first syllable of the word.
2a. Review the meaning of the second underlined word on the board, and by questioning similar to that at the right, elicit from students the fact that the meaning of this word denotes action. Write the classification "Action Word" on the board.	2a. Say: You said that the word present in the second sentence means the same as the word, give. Q: Was the gift given to anyone in the second sentence? A: Yes. Say: The word give denotes an action of some kind. Therefore the word present is an action word. (verb) Write "Action Word" on the board.

<table>
<tr><th>Procedure</th><th>Development</th></tr>
<tr><td>2b. Direct students to listen to the pronunciation of this word to determine whether or not they can hear the part of the word that receives greater stress.</td><td>2b. Say: Listen to the pronunciation of the word that means to give: Present. Determine the part of the word that receives greater stress. (Say the word present)
Q: Were you able to determine the part of the word that received greater stress?
A: Yes, the second syllable received greater stress.</td></tr>
<tr><td>c. Write this word under the heading "Action Word" on the board and underline the stressed portion of the word. (Second syllable)</td><td>c. Write the word present under the heading "Action Word" and underline the second syllable.</td></tr>
<tr><td>3. Using the procedures in steps 1 and 2, have students determine the pronunciation of additional two syllable words which look alike but have different meanings. (Use examples, the same as or similar to those at the right.) List each underlined word under its proper heading "Object" or "Action Word" on the board and underline the stressed (accented) syllable in each word.</td><td>3. Sentences on the board:
The sanitation department collects refuse three times a week in my neighborhood. (object)
I had to refuse the invitation to the dance. (action word)

His school record is excellent. (object)
The teacher began to record the test marks. (action word)

A permit is needed to drive a car. (object)
The boy's father did not permit him to drive.</td></tr>
<tr><td>4a. Have all words listed under the classification, "Object", read aloud and direct students to listen to the stressed portion of every word in the list. By questioning, draw from students the conclusion that greater stress (accent) is given the first syllable in each word that refers to an object.</td><td>4a.
<table>
<tr><th>Object</th><th>Action Word</th></tr>
<tr><td>present</td><td>present</td></tr>
<tr><td>refuse</td><td>refuse</td></tr>
<tr><td>record</td><td>record</td></tr>
<tr><td>permit</td><td>permit</td></tr>
</table>
Say: As the words listed under each heading are pronounced, the rest of the class listen to the stress given to the underlined part of each word.
Q: Which syllable is given greater stress in all the words that refer to objects?
A: Greater stress is given the first syllable in words that refer to objects.</td></tr>
<tr><td>b. Using the procedures described in step 4a, draw from students the conclusion that greater stress (accent) is given the second syllable in each word that denotes action.</td><td>b. Q: Which syllable is given greater stress in words that denote action?
A: Greater stress is given the second syllable in words that denote action.</td></tr>
</table>

Procedure	Development
5. Give students practice in determining the pronunciation of words similar to those at the right. Question students about their reason for the pronunciation given each word.	5. Say: Pronounce the following words. Give a reason for your pronunciation. perfume (object) desert (action) object (action) compress (object)

SUMMARY

1. Refer to the purpose of the lesson written on the board, and through questioning, have students determine whether or not the purpose of the lesson was achieved.	1. Say: We said we were going to learn how to pronounce two syllable words that look exactly alike but have different meanings. Q: Did we achieve our purpose? A: Yes, we did learn how to pronounce such words.
2. Through questioning, highlight the guide that may aid in pronouncing two syllable words that look alike but have different meanings.	2. Q: Is there any guide which may help you pronounce two syllable words that look alike but have different meanings? Explain this guide. A: Yes, there is such a guide that often aids in determining the pronunciation of such two syllable words.
a. In such words that refer to objects.	a. Give greater stress to the first syllable when pronouncing words that refer to objects.
b. In such words that denote action.	b. Give greater stress to the second syllable when pronouncing words that denote action.

A Final Note

There are additional word-recognition lessons which the language arts teacher may use if students have already acquired an understanding of the skills described in the preceding lessons. In the social studies chapter of this manual, Lessons I, II, III suggest the procedures that may be used to develop the following word-recognition skills:

I. To develop the ability to find the meaning of new words when they are clearly explained in the context.

II. To find the exact meanings of words when no clues to their meaning appear in the context.

III. To understand that familiar words often have different meanings according to the context in which they are used.

The teacher may "downgrade" or "upgrade" the examples used to clarify the procedures by substituting simpler examples or more advanced examples, depending upon the needs, interests, and maturity level of the students.

USING THE DICTIONARY

For severely disabled readers, teachers may develop as an initial lesson, procedures one through five in the lesson that follows which deals with word placement in the alphabet. In a subsequent lesson, teachers may develop procedures six through nine, dealing with word placement in the dictionary. Teachers may adapt this dictionary lesson to meet the needs, interests, and maturity level of the students by substituting simpler or more advanced examples for those listed in Column II. In preparation for this lesson, it is necessary that the teacher provide a set of dictionaries for distribution to the class.

LESSON I

Work-Study Skill: Developing the efficient use of the dictionary in locating a specific word.

APPROACH

Procedure	Development
1. Have students participate in the following "timed" activity in order to have them recognize that they need help in locating words in a dictionary:	1. Timed activity to determine methods students use to locate a word in the dictionary:
a. Write a specific word on the board.	a. Write the word, pillage, on the board.
b. Direct students to locate this word in the dictionary within a specified time limit.	b. Say: Locate the word, pillage, in your dictionary. I will allow you half a minute to find the word. (Pronounce the word pillage, as you point to it.)
c. Observe the methods used by students to locate the word in the dictionary.	c. Observe students approach to locating the word during the time allotted to them.
d. Through questioning similar to that at the right, determine the number of students who succeeded in locating the word and elicit from students possible reasons for some students failing to locate the word within the time limit.	d. Q: How many of you located the word? (Students raise hands in answer to question and teacher observes the approximate number of students who did not succeed in finding the word.) Say: Some of you were unable to locate the word, pillage, in the time allowed you. Q: Do you have any idea why you were not able to locate the word in the time allowed? A: We didn't have enough time to find the word.
e. Tell students teacher's observations while they were locating the word, and explain to them that there is a quicker, more efficient way to locate words in the dictionary.	e. Say: As I watched you locating the word in your dictionary, I noticed that some students began to look for the word, pillage, in the beginning of the dictionary, and then proceeded to turn page after page trying to find the word. This takes too much time. That is

Procedure	**Development**
	1e. Say: (Continued) why some of you did not find the word quickly. There is a quicker, more efficient way to locate words in the dictionary.
2. State the purpose of the lesson, the same as or similar to that on the right, and write the aim on the board.	2. Say: We shall learn a quicker, more efficient way to locate words in the dictionary. (Write aim on board.)

DIRECT TEACHING

1. Through questioning, elicit from students specific information about the contents of the dictionary, the same as or similar to that at the right.	1. Q: What does the dictionary contain? A: The dictionary contains a long list of words and their meanings. Q: How are the words in the dictionary arranged? A: The words in the dictionary are arranged in alphabetical order.
2. Briefly review the letters of the alphabet, and write them across the top of the board.	2. Say: I know that you are familiar with the letters of the alphabet. Tony, say the letters of the alphabet as I write them across the top of the board, abcdefghijklmnopqrstuvwxyz.
3. Through questioning similar to that at the right, have students divide the letters of the alphabet into four equal parts. Draw lines on the board to show these four sections. Direct students to examine the letters of the alphabet contained in each of the four sections, in order to determine the names of the letters contained in each section. (Note that the alphabet may be divided into three parts instead of four, if the teacher so desires.)	3. Q: How many letters are in the alphabet?--(26) What is half of 26?--(13) Say: The thirteenth letter of the alphabet is m. (Draw a long line down the board after the letter, m, dividing the letters of the alphabet into two equal parts.) Example: abcdefghijklm | nopqrstuvwxyz Say: This line divides the letters of the alphabet in half. Letters a through m are in the first half and letters n through z are in the second half. Say: The middle letter between a and m is g. The middle letter between n and z is t. (Draw a long line after the letter g and after the letter t on the board.) Example: abcdefg | hijklm | nopqrst | uvwxyz Say: We have now divided the letters of the alphabet into approximately four equal divisions. Study the letters that are contained in each division for the next few seconds. Example: a to g | h to m | n to t | u to z
4a. Present a word card to each student, the same as or similar to those at the right, and direct	4a. Say: Place each of these word cards in its proper column on the blackboard:

Procedure

4a. (Continued)
individual students to scotch tape the word card in its proper column on the blackboard, one under the other.

Development

4a. Say: (Continued)

abcdefg	hijklm	nopqrst	uvwxyz
fur	kite	robin	zest
bird	money	oven	x-ray
apple	jelly	time	unite
copy	ice	summer	victor
guard	lace	nothing	yellow
dinner	heart	pear	war
elf		queen	

Procedure

b. Through questioning, have pupils explain why they placed each word card in a specific column.

Development

b. Q: Is each word card in its proper column? (Yes) How do you know?
A: The words in the first column begin with letters a through g. The words in the second column begin with letters h through m, etc., etc.

Procedure

5a. Have students examine the words in each column of the alphabet on the board, and through questioning, elicit the fact that the words are not in alphabetical order according to the initial letter of each word.

Development

5a. Say: Look at the words placed in each division on the board.
Q: Do you think you would find these words listed like this in the dictionary?--No. Why not?
A: The words in the dictionary are arranged in alphabetical order. The words in each column are not in alphabetical order.

Procedure

b. Have students arrange the words in alphabetical order.

Development

b.

abcdefg	hijklm	nopqrst	uvwxyz
apple	heart	nothing	unite
bird	ice	oven	victor
copy	jelly	pear	war
dinner	kite	queen	x-ray
elf	lace	robin	yellow
fur	money	summer	zest
guard		time	

Procedure

6. Question students about the similarity that might exist between the contents of the four columns of the alphabet on the board and the contents of four such sections of their dictionaries.

Development

6. Q: Do you think we can divide our dictionaries into four parts similar to the columns on the board?--Yes. How can we do this?
A: We can divide our dictionaries in half, and then divide each half again so that we have divided our dictionaries into four similar sections.

Procedure	Development
7. Direct students to divide the contents of their dictionaries into four sections. Have students note the initial letter of the words included in each section. (Note that the dictionary may be divided into three parts instead of four, if the teacher so desires.)	7. Say: Divide your dictionary into approximately two equal parts. Q: What is the initial letter of the words found in the middle of the dictionary?--(the letter, l) Say: Then in this dictionary words beginning with letters a to l would be found in the first half, and words beginning with letters m to z would be found in the second half. Say: Now divide the first half of your dictionary into two parts. Q: What is the initial letter of the words found in the middle of the first half?--the letter, d. Say: Then words beginning with letters a to d are found in this section of the dictionary, and words beginning with letters e to l are found in the second section of the dictionary. Say: Divide the second half of your dictionary into two parts. Q: What is the initial letter of the words on these pages?--the letter, r. Say: Then words beginning with letters m to r are found in this section of the dictionary and words beginning with letters s to z are found in the last section.
8. Review the initial letters of the words contained in each of the four sections of the dictionary. Write these letters on the blackboard in column formation. (Note that dictionaries vary according to grade level, number of entry words, etc.)	8. Q: What are the initial letters of the words contained in the first division or section of your dictionary? The second division? The third division? The fourth division? Write on the board: Sec. I — Sec. II — Sec. III — Sec. IV a to ? — ? to l — m to ? — ? to z
9a. Give students practice in turning to the specific division of the dictionary that contains words, the same as or similar to those at the right. Observe students' activity in locating the correct section of the dictionary.	9a. Say: Turn to the section or division of the dictionary where the following words may be located. broom - Section I value - Section IV race - Section III pat - Section III girl - Section I winning - Section IV
b. Through questioning, elicit from students the value of the ability to locate words in a dictionary quickly.	b. Q: Why is it useful for you to know the letters contained in each of the four divisions or sections of your dictionary?

Procedure

Development

9b. A: If we have to locate a word in our dictionary, all we have to do is to note the initial letter of the word we must locate, and then turn immediately to the division of the dictionary that contains words beginning with that letter.

SUMMARY

Review the purpose of the lesson and through questioning similar to that on the right, have students decide in what way this skill can help them.

Refer to the aim on the board:

Q: Did we learn a way to locate words in the dictionary quickly?--Yes.

Q: What did we learn?
A: We learned to open the dictionary to the part in which the specific word is located.

Q: How can this skill help you?
A: This skill is a time-saver when locating words in the dictionary.

A Final Note

When students have mastered the above dictionary skill, the teacher may refer to the following lessons which develop more advanced skills:

1. Understanding the function and use of guide words. (Language Arts Chapter)
2. Understanding the use of diacritical marks as an aid to pronunciation. (Language Arts Chapter)

Before developing number two above, teachers must instruct students in the skill of selecting the correct definition of a word according to the context in which the word is used. (Social Studies Chapter)

CONCLUSION

In order to further aid the retarded reader in the junior high school, the language arts teacher may develop more advanced reading skills when the students are ready. To do this, the teacher may use content material taken from any and all subject areas. Therefore, many of the lessons in the body of this manual may be adapted by the teacher for instructional purposes. These include lessons developing the ability to use contextual clues to word meaning, and finding the main idea of paragraphs. Several of the work-study skills lessons may also be adapted by the language arts teacher. Among these are the lessons which develop skimming and surveying, reading and interpreting graphic materials, and reading and following printed directions.

The exact procedures in each of the lessons should be followed as listed in Column I. However, the suggested subject area content, which develops the procedures, may be too difficult for retarded readers. The teacher should substitute appropriate material suitable to the reading level of the students.

ANNOTATED READINGS AND MATERIALS

Among the publications which may be useful in planning and carrying out a junior high school reading program are professional reference books, pamphlets, workbooks, wall charts, trade papers, etc. This section, arranged by subject areas, contains an annotated listing of the publications found most effective by members of the Junior High School Reading Project, and the teachers who worked with them, in instructing students in the reading skills in language arts, social studies, science, mathematics, and industrial arts.

LANGUAGE ARTS

Professional Readings

BOND, GUY L. and WAGNER, EVA. *Teaching the Child to Read,* 3rd Edition, 1960. Macmillan Company, 60 Fifth Ave., New York 11, N.Y.

An overview of how a child learns to read. Specifically useful for junior high school teachers who do not know how reading is taught in the elementary grades.

HARRIS, ALBERT J. *How to Increase Reading Ability,* 4th Edition, 1961. David McKay Company, Inc., 119 West 40th Street, New York 18, N.Y.

Contains information on factors influencing reading readiness, the teaching of beginning reading, individualized reading and group reading, causes of reading disabilities, teaching for independence in word recognition, and improvement of reading rate.

JEWETT, ARNO, ed. *Improving Reading in the Junior High School.* Office of Education, Bulletin No. 10, 1957, Superintendent od Documents, United States Government Printing Office, Washington, D.C. 165 pp. 60 cents.

Reading authorities discuss ways research findings may be used to improve reading instruction. They offer suggestions for conducting a developmental program, define responsibilities of subject area teachers for giving reading instruction, discuss ways to set up a remedial reading program, review evaluation techniques and instruments, and review state-wide programs for improving reading. Bulletin emphasizes for teachers the implications of significant research in reading. Includes extensive annotated bibliography on research and local reading programs.

LEAVELL, ULLIN W. *A Functional Reading Program in Grades 7 through 9.* The ABC Language Arts Bulletin. An American Book Company Educational Research Service. American Book Company, 55 Fifth Avenue, New York 3, N.Y.

Answers the following questions:
a. What conditions have caused the extension of reading instruction beyond Grade 6?
b. What are the major skills to be stressed in a reading program in Grades 7 through 9?
c. What can be done about improving students' rate of reading?
d. By what means can pupils be led to recognize some of the practical values of reading?
e. What is the place in a school reading program for teaching the appreciational skills?
f. Who must take the responsibility for the improvement of reading skills?

STRANG, RUTH. *Reading and the Junior High School Teacher.* Bulletin Number 12. Wesleyan University Press, Education Center, Columbus, Ohio.

Discusses in capsule form, answers to the following questions:
a. What is reading?
b. What is the teacher's responsibility?
c. How do you teach reading in the junior high school?
d. Is reading taught at the expense of subject matter?
e. Should a developmental reading program be introduced?

Free and Inexpensive Materials

Building Reading Skills. American Education Publications, Education Center, Columbus 16, Ohio. (free)
Presents a broad view of the reading skills with some practice exercises and suggestions for developing the skills. (Materials prepared by Editors of Read Magazine.)

11 Steps to Reading Success. American Education Publications, 1250 Fairwood Avenue, Columbus 16, Ohio. (free)
Contains material on the elementary level suitable for instructing the inefficient reader in the junior high school.

100 Good Ways to Strengthen Reading Skills. Scott, Foresman & Company, Fairlawn, N.J. (free)
Practice exercises which may be rexographed to use with students who need corrective reading in the junior high school.

The Library. Zimmerman, Petrucci, and Mathy. Charles E. Merrill Books Inc., Columbus 16, Ohio. (60 Cents)
A library skill text to aid in developing basic library skills. Grades 4 through 8.

Curriculum Aid Materials. (kit) New York Times School and College Sercive, New York 36, N.Y. (free)
Excellent materials for developmental program in reading. Materials include a booklet that contains twenty skill lessons based on reading a newspaper.

The New Cathedral Basic Reading Program. (wall chart) Scott, Foresman & Company, Fairlawn, N.J. (free)
Offers clues to syllabication, vowel sounds, and accent. Suitable for instructing the severely disabled reader in the junior high school.

Propaganda Devices. (wall chart) Scott, Foresman and Company, Fairlawn, N.J. (free)
Contains material pertinent to developing the ability to read critically and to recognize slanted writings. Suitable for the more mature junior high school student.

Thorndike - Barnhardt Dictionary. (wall chart) Scott, Foresman & Company, Fairlawn, N.J. (free)
Includes teaching hints for developing dictionary study skills for students in the junior high schools who need corrective reading.

Reading Skills Practice Materials

GRAY, HORSMAN, MONROE. *Basic Reading Skills for High School Use.* Scott, Foresman and Company, Fairlawn, N.J.
Practice exercises for drill on a variety of reading skills in all subject areas, specifically for 9th grade and the more advanced reader.

SMITH, NILA B. *Be a Better Reader.* Books I, II, III, IV. Prentice-Hall, Inc., Englewood Cliffs, N.J.
Practice materials in the reading skills related to all subject areas Suitable for grades 7 through 9. Book IV is recommended for the accelerated reader in the junior high school.

STRANG, RUTH. *Study-Type Reading Skills.* Teachers College Publications, Columbia University, 120th Street and Broadway, New York City.
Study skills suitable for the more advanced reader in the junior high school.

Reader's Digest Skill Builders. Books 1, 2, 3, 4, and Advanced 1, 2, 3, 4. The Reader's Digest Association, Pleasantville, New York.
High interest articles with a wide range of grade levels. Comprehension check for each article.

SOCIAL STUDIES

Professional Readings

BOND, GUY L. and WAGNER, EVA. *Teaching the Child to Read,* 3rd Edition, 1960. Macmillan Company, 60 Fifth Avenue, New York 11, N.Y., pp. 278-29[illegible].
One of very few publications emphasizing the teaching of reading within the area of geography. The importance of comprehending geopraphic terms is stressed, and helpful hints on how to present these concepts in order to avoid misunderstandings are made clear.

GRAY, WILLIAM S., ed. *Improving Reading in All Curriculum Areas.* Supplementary Educational Monograph No. 76, 1952. University of Chicago Press, Chicago, Illinois.

Fair, Jean, "Interpreting Social Studies Materials in Grades Seven to Nine", pp. 179-183.

A worthwhile account of how to initiate and carry on a social studies unit involving critical reading, interpreting information, outlining, and drawing conclusions. Especially recommended for the new teacher interested in a step by step account of how to provide reading experiences within the daily social studies plan.

HARRIS, ALBERT J. *Effective Teaching of Reading,* 1962. David McKay Company, Inc., New York, pp. 270-271.

The author states that maps, charts, and graphs found in social studies books, provide a great deal of information which can be treated as reading selections. He suggests detailed attention be given to this type of reading material so that pupils will find it easier to read and understand other types of illustrations.

STRANG, RUTH AND BRACKEN, DOROTHY KENDALL. *Making Better Readers,* 1957. D.C. Heath & Co., New York, pp. 71, 221-242.

This material makes specific reference to skills essential to the understanding of social studies concepts taught at the junior high school level. It enables the teacher to integrate vocabulary development skills, comprehension skills, and work study skills into their social studies units.

Social Studies in Elementary Education, 1959. Division of Education, San Diego State College, Macmillan Co.,Chapters 8 and 9.

The skills pertinent to effective functioning in reading social studies materials are pinpointed and techniques for developing these skills are suggested on pp. 220-228.

TIEGS, ERNEST W. and ADAMS, FAY. *Teaching the Social Studies,* 1959. Ginn & Co., New York. Chapters 10,11, and 13.

Chapters 10 and 11 treat the essential reading skills in social studies. The criteria for evaluating the readability of basic social studies materials are given in chapter 13. This might be helpful for supervisors and social studies chairmen when ordering materials.

WEISS, M.J., ed. *Reading in the Secondary Schools,* 1961. Odyssey Press, New York,

Fair, Jean. *"Materials for the Unit Plan in Social Studies",* pp. 409-414.

The author emphasizes the use of textbooks, historical novels, non-fiction articles, and books, as well as classic documents. These materials are recommended as aids in the development of abilities in critical and creative thinking. A plea is made for a study of meaningful materials and the interpretation of graphs and tables. An excellent article for the teacher perplexed over the selection of materials for use with gifted students.

WEISS, M.J., ed. *Reading in the Secondary Schools,* 1961. Odyssey Press, New York

Rudisill, Mabel. "What Are the Responsibilities of Social Studies Teachers for Teaching Reading?" pp. 402-408.

Written from the viewpoint of analyzing the reading skills of advanced students, the article reiterates the work-study and comprehension skills which efficient readers have acquired. Teachers of mature readers have found the article of greatest value.

Reading Skills Practice Materials

Curriculum Foundation Series. *Basic Reading Skills for Junior High School Use,* 1957. Scott, Foresman and Company, Fairlawn, N.J.

An excellent workbook from which the teacher may select practice materials covering the following reading skills:

Reacting to sensory images, p. 107
Perceiving relationships, p. 118-123
Using reference materials, p. 163-169

JOHNSON, ELEANORE M. *Modern Reading-Reading Improvement Skilltext.* Charles E. Merrill Company, Columbus, Ohio.

Book I: Refrigerator Land - Antarctica, p. 77
Book II: How Our States Were Named, p. 46
Life in a Chinese Village, p. 81

LEAVELL, ULLIN W. and BAILEY, MATILDA. *The Mastery of Reading*. Books I, II, III. American Book Company, 55 Fifth Ave., New York 3, N.Y.

Throughout this series of books are exercise materials with social studies content helpful for those pupils who have not mastered the study skills. These may be assigned to those pupils on an individual basis for independent work. The skill is noted above each exercise.

Book I: Reading a Time Table, p. 10
Daniel Boone, p. 66
Early Transportation in America, p. 68
Pioneer Days, pp. 70-75
Using a Map, p. 108

Book III: Map Reading, p. 103
Chart Analysis, p. 118

LONG and HALTER, *Social Studies Skills - With Individual Self-Testing Key*. Inor Publishing Company, a division of Roxbury Press, Inc., 203-205 Lexington Ave., Sweet Springs 1, Missouri.

A number of the more important skills needed in social studies are pointed out, and suggestions are given to learn these skills easily. After each skill is presented, there is a test to check the mastery of the skill.

GRAY, HORSMAN, MONROE. *Basic Reading Skills for High School Use*. Scott, Foresman and Company, Fairlawn, N.J.

Materials highlighting specific aspects of American History:
Two Great Presidents, p. 9
Our National Parks, p. 24
Trials to the West, p. 80
Mexico, p. 117

Valuable supplementary reading.

NEAL, ELMA A. and FOSTER, INES. *Study Exercises for Developing Reading Skills*, Book A. Laidlaw Brothers, Inc., 221 Fourth Avenue, New York 3, N.Y.

Exercises for the skills indicated:
No. 11 The Dairy Farm (understanding the story)
No. 16 Christopher Columbus (finding the central thought)
No. 20 The Jamestown Colony (finding the central thought)
No. 24 The Growth of the United States (following directions)
No. 44 Columbus' First Voyage (following directions)

RYAN, NELLIE F. *Your Reading Guide*, Book I (Grade 7), 1955. Lyons and Carnahan, 225 South Main Street, Wilkes Barre, Pa., pp. 28-36, 37-46.

A complete coverage of the social studies skills one must teach to locate information. This material may be integrated with the library skills. The section devoted to using maps, graphs, tables, and illustrations is very complete and should be invaluable in teaching students to read and interpret graphic materials.

RYAN, NELLIE F. *Your Reading Guide*, Book II (Grade 8), 1956. Lyons and Carnahan, 225 South Main Street, Wilkes Barre, Pa., pp. 54-62, p. 88.

A workbook that includes map reading: political, physical, population and product maps, as well as weather maps and air maps. A fine selection of graphs and an explanation of how to solve social studies problems provide helpful materials for the teacher.

SMITH, NILA BANTON. *Be a Better Reader*, Books I, II, III. 1958. Prentice-Hall Englewood Cliffs, N.J.

Book I: pp. 68, 69, 84, 124.

These pages provide outstanding practice materials for social studies classes. How to associate dates with events and remember them in order, cause and effect, how to recall detailed facts, and how to read critically, are among the skills which the author has included.

Book II: pp. 45, 20-21, 34, 35, 44, 48, 49, 59,62, 63, 76, 80, 88, 90, 104, 105, 121, 125, 144.

Almost every skill essential to teaching reading within the area of social studies has been included by the author. In each case, the selections are based on real life situations and will make interesting reading, as well as provide valuable practice in vocabulary development, critical reading, author's viewpoint, fact and opinion, cause and effect, making comparisons and summaries, and finding main idea.

Book III: pp. 4-5, 21, 36, 37, 46, 48, 52-53, 124-125.

In addition to reviewing and amplifying the skills presented in Books I and II, materials as interpreting the author's meaning and understanding other points of vieware included. Applying citizenship information to personal life, associating dates with events in sequence, grasping details, making comparisons and contrasts, and recognizing relationships between main ideas and supporting details, add to the value of this book as a teaching tool.

Free Materials

A Brief History of New York City. Promotion Department, Empire State Building, 350 Fifth Ave., New York City 1, N.Y.

A pamphlet which presents a time line of facts with information on points of interest throughout the city. Good for supplementary reading.

Armour Food Source Map. Armour and Company, Public Relations Department, Chicago, Illinois.

Large wall map of the U.S., in colors, with history of the American food industry on the reverse side. Good for map reading and for supplementary reading on the rise of industries.

Comic Style Booklets on the Railroad. School and College Service, Association of American Railroads, Transportation Building, Washington 6, D.C.

"Across America"
"All Aboard, Mr. Lincoln"
"Railroads Deliver the Goods"
"Ride the High Iron"
"Special Agent"

These booklets have an appeal for the inefficient reader in the junior high school. Good for supplementary reading.

Conservation U.S.A. Educational Department, New York Herald Tribune, 230 West 41st Street, New York 36, N.Y.

An illustrated booklet containing information pertinent to conservation of our natural resources. Good for the more mature student in the junior high school.

Curriculum Aid Materials. The New York Times, School and College Service, New York City 36, N.Y.

Excellent practice material for developing social studies reading skills. Very good for instructing the more mature junior high school reader.

Good Citizen. The American Heritage Foundation, 11 West 42nd Street, New York 36, N.Y.

This booklet describes the "working tools" of good citizenship and tells how to use them, Recommended for all grades in presenting an overview of the responsibilities and privileges of citizenship.

Map of North America. Public Relations Department, Dairymen's League Cooperative Association, Inc., 100 Park Avenue, New York 17, N.Y.

A pictorial map of North America indicating the concentration of dairying areas on the continent. Good for social studies content and for map reading interpretation.

New York. Bankers Trust Co., Public Relations Department, 280 Park Avenue, New York 17, N.Y.

In addition to narrative material, this booklet contains excellent photographs of important places in New York City. Descriptive data is listed for each place, including information on the places which are free to the public. It also indicates how these places can be reached by public transportation.

Presidents of the United States. John Hancock Mutual Life Insurance Company, Boston, Mass.

This booklet presents in brief narrative form the highlights in the lives of each of the presidents of the United States. Good for student reference and for supplementary reading.

SCIENCE

Professional Readings

BOND, G.L., and WAGNER, E.B. *Teaching the Child to Read,* Third Edition, 1960. The Macmillan Company, New York. pp. 265-271.

These pages present the reading inherent in the science area and could well be used as a basis for discussion at a departmental conference.

DEASON, HILARY S. *Books of the Traveling High School Library.* 1957. American Association for the Advancement of Science and The National Science Foundation, Washington, D.C.

An annotated list of 200 books in science and math for junior and senior high school students. The books are indexed by subjects, such as agriculture, anthropology, astronomy, atomic science etc. Most of the books were selected because of their potential appeal to the reader with little or no background in science.

JEWETT, ARNO, ed. *Improving Reading in the Junior High School.* Office of Education Bulletin No. 10, 1957. Superintendent of Documents, U.S. Printing Office, Washington, D.C.

Barnard, J.D. "The Responsibilities of Science Teachers for Teaching Reading," pp. 85-90.

This article pinpoints the need for reading instruction in science and discusses the role of the science teacher in giving this instruction. It would make a good springboard for discussion at a departmental meeting.

New York City Board of Education. *Curriculum and Materials,* No. 2. November 1955. "Improvement of Reading, a Job for Everyone" and "Teaching Reading in the Secondary Schools".

These two pamphlets clearly state the policy of the Board of Education in reference to the teaching of reading in the subject areas.

New York City Board of Education. *Reading in the Secondary Schools,* 1961. Bureau of Curriculum Research, New York.

Contains a section called Reading in Science which highlights the various purposes of science reading and the importance of developing science vocabulary and scientific concepts.

Science for Today's Students and Science Teacher's Notebook. Scott-Foresman and Co., Fairlawn, N.J.

Four page pamphlets which highlight information on current science topics and offer suggestions for teaching them. Issued periodically and available upon request.

STRANG, R., and BRACKEN, D.K. *Making Better Readers.* D.C. Heath and Co., New York, 1957. pp. 243-251.

Lists the responsibilities of the science teacher for giving students direct instruction in the reading skills which are basic to science learnings.

Free and Inexpensive Materials

Breakfast Source Book. Cereal Institute, Inc., 135 S. LaSalle Street, Chicago 3, Illinois.

Useful booklet for teachers in giving instruction in adequate diet for nutritional purposes.

Electricity and Wheels. General Motors Company, Detroit, Michigan.

Explains how electricity and the lessons learned from it have made the manufacture of automobiles possible and safe. Teachers are required to order on school stationery. Orders not to exceed 50 copies.

General Electric, Schenectady, New York.

Comic-book type material on the atom, electricity, etc. Good for independent reading and for extending understandings already learned. Recommended for the inefficient reader.

Right Eating-Keeps You Swinging. Carnation Company, Los Angeles, California.

A colorful booklet on the importance of correct eating directed to the attention of the teenager.

Short Stories of Science and Invention. General Motors Company, Detroit, Michigan.

A collection of radio talks covering such topics as transportation, war, men of science, nature, and medicine. A worthwhile addition to a classroom science library for use by the more advanced reader.

The Home Meal Planner - A Key to Better Meals. General Foods Corporation, General Foods Kitchens, 250 North Street, White Plains, New York.
Contains basic plans for the three daily meals, food lists, and meal planning hints.

Uncle Wethbee's New York Weather Almanac. Consolidated Edison, 4 Irving Place, New York 3, N.Y., Room 2600.
Contains concise information and numerous illustrations on weather, weather terms, weather bureau, tools, how to read a weather map, etc. A good source material for student use.

Charts. American Petroleum Institute, 50 West 50th Street, New York 20, N.Y., Education Dept.
"Science in Search for Oil"
"Distillation"
"Chemistry of Petroleum"
"Refining"
"Transportation Since 1775"
Large, attractive, colorful charts which can be used for bulletin board display and for stimulating interest in the topic.\Suggestions for teacher use are included.

Food Chart. General Foods Corporation, General Foods Kitchens, 250 North Street, White Plains, New York. (free)
The basic food areas and the individual foods contained therein are listed with their nutritive and energy values. Information about good nutrition as a key to good health is given on the reverse side of the chart.

Pictures. Ford Motor Co., Dearborn, Michigan., Educational Affairs Dept.
Contains pictorial material on such topics as space vehicles, space exploration, and the lunar capsule. Recommended for use by the teacher for the advanced reader.

A Girl and Her Figure and A Boy and His Physique. National Dairy Council, Greater New York Program, 202 East 44th Street, New York 17, N.Y.
Good material for use with teenagers to point up the importance of eating basic foods.

Food for New York's Millions. New York City, Department of Markets, Bureau of Consumers Service and Research. Municipal Building, New York City, N.Y.
Contains detailed information concerning the foods essential for body growth and their sources of supply.

Reading Skills Practice Materials

SMITH, NILA BANTON. *Be a Better Reader.* Books I-V. Prentice-Hall, Englewood Cliffs, New Jersey.
These workbooks are designed to develop special skills needed for effective reading in the subject areas, including science. Exercises are included in all books of this series in order to develop such skills as classification, outlining, drawing conclusions, recalling science facts, and making generalizations.

Reading Adventures. Booklets, A, B, C, by the editors of My Weekly Reader, Columbus, Ohio.
Each booklet is arranged in five units: Animal Adventures, Weather and You, Food Trails, Travel Ways, and Science Adventures. Book B is on approximately a fourth grade level and Book C is on a fifth grade level. These booklets may be used by the inefficient reader for independent activities.

GRAY, HORSMAN, MONROE. *Basic Reading Skills for Junior High School Use.* Scott Foresman and Company, Fairlawn, New Jersey.
Examples: On pp. 45, 46, 53, 73, 74, may be found material to develop such skills as:
Perceiving Relationships (cause and effect)

JOHNSON, ELEANORE M. *Modern Reading - Reading Improvement Skilltext.* Charles E. Merrill Co., Columbus, Ohio.
Examples: Book I
Airflight, pp. 93-100.
New Tricks with Sounds, p. 111

LEAVELL, ULIN W., and BAILEY, MATILDA. *The Mastery of Reading,* Books I, II, III. American Book Co., New York.
Examples: Book I
Primitive Birds, p. 107
Birds' Touring Season, P. 109
James Watt and the Tea Kettle, p. 110
Words in Science, p. 112

Examples: Book II
The Weather Throughout the Nation, p. 86
Book III
Studying a Weather Map, p. 113
The skill to be developed is noted above each exercise.

RYAN, NELLIE. *Your Reading Guide,* Books I and II. Lyons and Carnahan, Chicago, Illinois.
Both books have exercises designed to develop the skills of reading science problems, reading tables and illustrations, and understanding science vocabulary.

The preceding workbook series contain practice exercises which employ science content and can be used with students who have not mastered the study skills. The science teacher may use these specific exercises as assignments for independent work.

Periodicals

Current Science - Weekly Science Newspaper. University Press Inc., 11 West 42nd Street, New York 36, N.Y.
Reading content is geared for grades 5-7. It contains reading exercises related to the content for developing word meanings, study skills, etc. About 10 pages per issue. A teacher's edition is available upon request. Cost - 70 cents per student for a school year; 35 cents for one semester.

Science World - A Scholastic Magazine. Science World, 900 Sylvan Avenue, Englewood Cliffs, New Jersey.
Reading content is geared for grades 7-12. About 40 pages per issue. Issued 16 times during a school year. Cost - $1.50 per student for a school year; $1.00 for one semester. Teacher edition $4.50 a school year.

MATHEMATICS

Professional Readings

BOND, GUY L. and WAGNER, EVA. *Teaching the Child to Read,* 3rd Edition, 1960. The Macmillan Company, 60 Fifth Avenue, New York 16, N.Y.
Pages 271-276 contain instructional materials for teachers on the following topics:
Reading Arithmetic
Adjustment to Vocabulary
Basic Study Skills in Arithmetic
Comprehension Abilities in Arithmetic
While this material pertains to reading in arithmetic on the elementary level, it is specifically useful to the mathematics teacher who is instructing the inefficient reader in the junior high school.

GRAY, LILLIAN and REESE, DORA. *Teaching Children to Read,* 2nd Edition, 1957. The Ronald Press, 15 East 26th Street, New York 10, N.Y.
This book is designed as a text for teachers of reading in the elementary and secondary schools. It is a practical guide for the classroom teacher and the reading specialist.
Page 397 contains materials on the topic, Reading in Arithmetic Content, with emphasis on reading problems in mathematics.

MORTON, ROBERT LEE. *Teaching Children Arithmetic.* 1953. Silver-Burdett Company, 45 East 17th Street, New York 3, N.Y.
The author indicates the responsibility of the mathematics teacher to teach the reading inherent in mathematics.
Reading in Arithmetic, pp. 13-15, 484, 491, 493

Reading in the Secondary Schools. Curriculum Research Report 1961. Board of Education of the City of New York, Bureau of Curriculum Research. Curriculum Center, 130 West 55th Street, New York 19, N.Y.
The material on pages 55 and 56 deals with the reading skills in mathematics and the problems involved in reading difficult mathematics texts Very informative for the mathematics teacher.

STRANG, RUTH and BRACKEN, DOROTHY KENDALL. *Making Better Readers,* 1957. D.C. Heath and Company, 180 Varick Street, New York 14, N.Y.
Pages 252-256 describe the special kinds of reading required in mathematics, such as reading equations, formulae, tables, and graphs. The importance of the basic reading skills and the vocabulary needs are emphasized.

STRANG, RUTH. McCULLOUGH, CONSTANCE. TRAXLER, ARTHUR. *The Improvement of Reading,* 3rd Edition, 1961. McGraw-Hill Book Co. Inc., 330 West 42nd Street, New York 36, N.Y.

Pages 159-168 deal with the improvement of reading in mathematics and offer mathematics teachers practical information on the following topics:

- Difficulties with Terms
- How to Meet Difficulties with Terms
- Difficulties with Comprehension and Speed
- How to Meet Difficulties of Comprehension and Speed
- Directions for Developing Reading Skills
- Aids in Reading Difficult Texts

Free and Inexpensive Materials

The Amazing Story of Measurement. Pamphlet, 1957. The Lufkin Rule Company, Saginaw, Michigan. (free in reasonable quantities to secondary teachers)

This pamphlet describes, in comic book form, the development of measurement from the primitive way of measuring by hand to the invention of the scientific instruments of measurement today. Good for arousing the interest of the inefficient reader.

Federal Income Tax, Student's Handbook. Booklet. U.S. Treasury Department. Publication No. 21. Washington, D.C.

This booklet contains graphs to read and interpret, directions to follow, and social security and internal revenue practice forms designed to give the accelerated reader an understanding of specific information on our country's tax program.

A History of Measurement. Poster Illustration. Ford Motor Company, Research and Information Department, The American Road, Dearborn, Michigan. (One set of six poster illustrations to a teacher, free)

Contains interesting pictorial representations and appropriate reading materials, from a description of the 16th century lawful meaning of the word rod, to the new mathematics concepts of tomorrow, the Age of Space.

General Electric's Answer to ... Three Why's. General Electric Educational Publication. Education Department, 570 Lexington Avenue, New York City.

Two of the "Three Why's" relate to mathematics.

- Why Study Mathematics, pp. 2-6
- Why Look into Engineering, pp.8-11

Excellent supplementary reading material. Good for the accelerated reader who is interested in selecting a career.

Reading Skills Practice Materials

RYAN, NELLIE F. *Your Reading Guide.* Book One, 1955. Book Two, 1956. Lyons and Carnahan, 225 South Main Street, Wilkes Barre, Pa. (Workbooks)

- Book One. (Grade 7)
  - Reading Graphs, pp. 43-47
  - Reading Problems, pp. 66-71
- Book Two. (Grade 8)
  - Reading Graphs and Charts, pp. 63-70
  - Reading Arithmetic Problems, pp. 81-87

These workbooks are more than practice books. They are also teaching books. They initiate the essential reading in mathematics skills and provide for the development of these skills through a series of practice exercises.

SMITH, NILA BANTON. *Be a Better Reader.* Books I, II, III, 1958. Prentice-Hall, Englewood Cliffs, N.J.

Book I. Inside front cover lists the mathematics reading skills included in the workbook.

Example: Reading mathematics problems.
Reading graphs.
Measuring mileage on a map.
Plotting designs to scale.
Following directions.

Practice exercises on the reading in mathematics skills are included in the units listed inside the back cover.

Example: Problems on air and space travel suitable for the on grade reader, p. 8
Working with arithmetic words, p. 96

Books II & III. Inside the front cover of each book is a listing of the reading in mathematics skills, with the page numbers on which practice materials for each skill are located. These workbooks provide excellent teaching devices and valuable practice materials for developing the reading in mathematics skills.

INDUSTRIAL ARTS

Professional Readings

STRANG, RUTH. and BRACKEN, DOROTHY. *Making Better Readers*, 1957. D.C. Heath and Company, New York. pp. 276-278.

An instructional sequence for teaching "terms of the trade" is given, plus a modified listing of readable pamphlets on unskilled and semi-skilled work.

STRANG, R. McCULLOUGH, C. and TRAXLER, A. *The Improvement of Reading*, Third Edition, 1961. McGraw Hill Book Company, New York. pp. 187-191.

The need for teaching reading skills in the area of industrial arts is emphasized, and the skills necessary for reading and evaluating trade materials are outlined.

Free and Inexpensive Materials

Woodworking

Many teachers use the valuable booklets and chart materials issued by equipment and service companies for the following purposes:

- to encourage independent reading
- to arouse interest in a particular unit of study
- to furnish reference material for assignments and reports in selected areas of study
- to broaden understandings previously taught
- to develop an awareness of the availability and value of commercial materials for use by the general public

The materials listed below are some which have been found useful for the aforementioned purposes:

A B C's of Hand Tools. General Motors Corporation, Detroit, Michigan.
Illustrated listing of the correct use and care of hand tools.

How to Take Care of Furniture. Johnson's Wax, Consumer Service Department, Racine, Wisconsin.
The importance of wax as a furniture conditioner and finisher is stressed. A furniture care checklist is included in the booklet.

Manual of Carpentry. American Steel and Wire, Division of U.S Steel, Literature Department, Rockefeller Building, Cleveland 13, Ohio.
This booklet is an easy reference source of fundamental carpentry tools and materials for the average layman. Descriptive literature is also available for all types of wire and screw stock.

Stanley Tool Guide. Stanley Works, Stanley Tools, New Britain, Conn. (25 cents per copy)
The care and use of tools is presented with more than 200 illustrations and a minimum of narrative material.

How to Use Hand Tools. Crescent Tool Company, Jamestown, New York.
Illustrated pamphlet showing the different tools used in woodworking.

The Story of Lumber and Allied Products. American Forest Products Industries, Inc., 1816 North Street N.W., Washington 6, D.C.
The story of lumber is told in a simple and interesting style.

Other Areas

The teachers' manuals issued by the Board of Education in each shop area, General Electricity, General Metal, and Graphic Arts, contain a listing of appropriate and inexpensive materials. These listings may be found in the last chapter of each manual, following the listing of projected materials. The listing includes materials such as:

Ceramics

1. Ceramics and Man Through the Ages. Aluminum Co. of America, Pittsburgh, Pa. A thirty-two page booklet showing pictorial examples of ceramics from neolithic times to the present.
2. Craftools Inc., 396 Broadway, N.Y. 13, N.Y. Charts: Throwing on the Potter's Wheels, Grinding and Mixing Ceramics Colors, Ceramic Sculpture, Glaze Spraying.

General Electricity

1. Booklets of interest to students of electricity may be obtained from the following companies: American Telephone and Telegraph Company, N.Y., Radio Corporation of America, N.Y., Bussmann Manufacturing Co., St. Louis, Mo.
2. The Department of Water Supply, Gas and Electricity, Municipal Building, New York City. The New York City Electrical Code. A bock that gives the law that must be followed in all electrical installations. Good for stimulating students to read materials on electricity. ($2.25)

General Metal

1. The Carborundum Co., Niagara Falls, N.Y. Abrasive Products. Natural color wall charts, good for display purposes.
2. Nicholson File Co., Providence, R.I. Wall Charts and Cartoon Illustrations.

Graphic Arts

1. Chandler & Price, Cleveland, Ohio. Press - Paper Cutter -Chart for display purposes.
2. The American Type Founders, 555 Broadway, N.Y. 12, N.Y. A set of twelve visual aids for composition.
3. Hammermill Paper Co., Erie, Pa. College and Museum Exhibit. Consists of eight jars showing the preparation of pulp, pictures illustrating the process of paper making, and a large picture of a Fourdrinier machine. The company will circulate this exhibit to schools which forward requests on official stationery.